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FEBRUARY 1988 £1.20

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● **WHOLE DISK COPY.** Copy a full unprotected disk in under two minutes with only one drive.

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● **FAST FORMAT.** Under 20 seconds.

● **TOOLKIT COMMANDS.** A whole range of useful new commands including: AUTO LINE NUMBERING, DELETE, MERGE, APPEND, OLD, LINESAVE, etc., PRINTERLISTER – list any program (including directory) directly from disk to printer or screen without corrupting memory.

● **REDEFINED FUNCTION KEYS.** Single stroke commands for operation of many common commands including: LOAD, SAVE, DIR. Load from directory – no need to type in filename.

● **TAPE TURBO.** Designed to make turbo load/save for your own programs. No screen blanking during loading.

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Disk includes **GRAPHIC SLIDESHOW** for displaying pictures saved with **ACTION REPLAY**. Plus Warp 25, Superboot – non Action Replay owners can speed up their 'expert' or 'freeze machine' programs to see what they have been missing.

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Action Replay will backup any program that any other cartridge can backup - and more! It also has an unmatched range of onboard features. Before you buy check our competitors ads to see what they offer and see how many of the Action Replay MK IV features are either not there or have to be loaded from Supergate disks etc. When you buy Action Replay if you don't find our claims to be true then return it within 14 days for a full refund.

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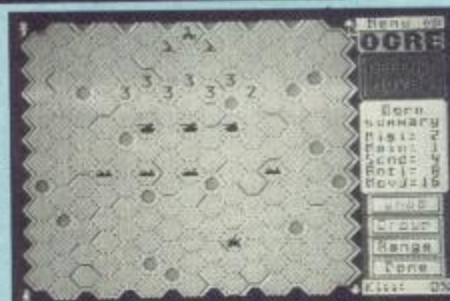
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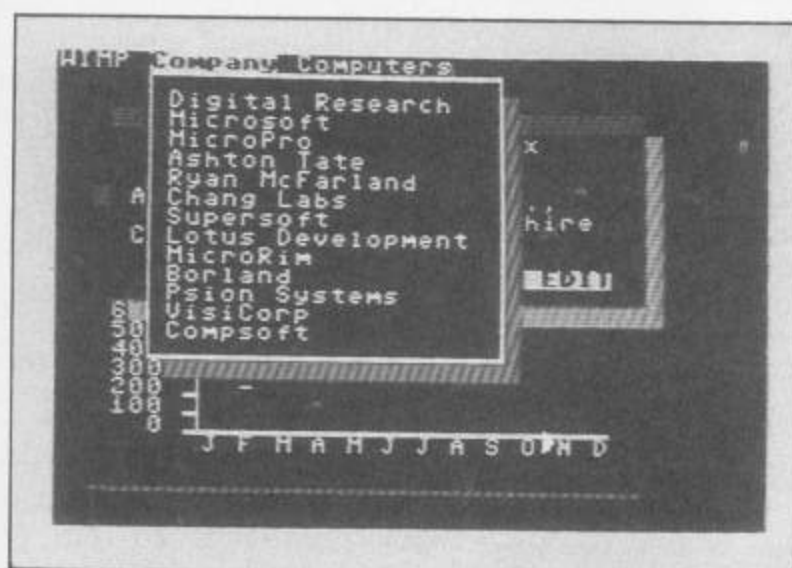
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DON'T FORGET

YOUR AMIGA

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NUMBER 5

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DATA STATEMENTS

Commodore's Golden Girl

Tessa Sanderson's bid to retain her Olympic Gold Medal is being fully backed by her new sponsors Commodore Business Machines in a deal inspired by actor and ex-pop star Adam Faith.

Sanderson's success in the javelin event at the 1984 Olympics has led to several television appearances which she has squeezed in amongst her many sporting commitments. It was her role in promoting sports in schools that attracted Commodore's managing director, Steve Franklin, to consider the sponsorship move:

"We want to help Tessa in her efforts to retain the gold medal she won in Los Angeles and in return, hopefully, we shall benefit from the

mass media coverage she attracts. In addition to this, Tessa does a lot with schools by promoting sports education. Schools, colleges and universities are very much a target area for us and Tessa will be helping us in our Roadshows which will visit UK educational establishments throughout the year."

When the Seoul Olympics appear on television later this year keep your eyes peeled for the Commodore logo which Tessa has promised to wear whenever she appears in public.

(l to r): Adam Faith, Seb Coe, Tessa Sanderson and Steve Franklin.



The Grand Slam Team (l to r) - Back Row: Tony Harvey, Elena Chivite, Peter Sleeman, Velda Hitchcock, Duncan Lowthian. Front row: Cathy Elliott, Stephen Hall, Andrew Noble, Becky Martin.

Good Buy APS

In a show of total confidence, Stephen Hall, Managing Director of Argus Press Software, has successfully concluded a management buy-out of the Company after several months of negotiations. The deal was clinched when Hall bought the whole of the issued share capital from its previous owners, the Argus Press Group.

As the new Chairman and Managing Director, Hall does not anticipate any great changes in the near future apart from a change of address from the Argus Press offices in Victory House and a change of company name to Grand Slam Entertainments.

The buy-out includes all of the APS assets and liabilities, including the back-catalogue, current stock, products under development and associated licences. The trading names Lothlorien, Mind Games and Grand Slam were also part of the deal.

Hall has bought the Company at a time when it has never looked stronger with products such as Red October and the arcade megahit Pacland poised for release.

Over the past 15 months there have been several additions to the staff at APS. Product Manager, Peter Sleeman joined Hall's team from Activision and Duncan Lowthian, Sales Manager, was previously with Microdealer. In an advisory capacity, Tony Kavanagh, ex-Gremlin Graphics, also lends his support and experience to the Sales Department as well as running his own company.

Despite the trials and tribulations of APS, accountant Andrew Noble has weathered the storms since 1985 and is duly awarded the extra responsibilities of Director and Company Secretary of Grand Slam Entertainments.

Last but not least is Cathy Elliott, Hall's Personal Assistant, who has the Herculean task of keeping the administration running smoothly.

As a part of the Argus Group, Your Commodore bids APS a fond farewell and wishes Grand Slam Entertainments every good fortune in the future.

Touchline:

Grand Slam Entertainments: Victory House, Leicester Place, London WC2H 7NB. Tel: 01-439 0666.

Stand and Deliver

If you have to move your printer from station to station, Bulldog Computer Services have the answer to your prayers in the form of a Mobile Printer Stand.

The unit is strong enough to take the kind of wear and tear that an office environment dishes out but the strength is tempered with lightness. The simple design features a split, one-size, steel top tray and non-slip antistatic rubber mats big enough to take either 80 or 132 column printers. Down below there is plenty of room for a stack of tractor-feed paper and a wire framed collection basket.

The units are finished in brown and sandstone with lockable forward castors. The price is £119 + VAT.

Touchline:

Bulldog Computer Services: Winston House, 81-83 Wood Street, Earl Shilton, Leicester LE9 7NE. Tel: 0455 44913.



Bulldog's Mobile Printer Stand

Focus on Germany

A West German order for 12 million of its 'High Focus' floppy disks has established RPS as market leader in the largest disk market in Europe – adding to an established reputation as a major force in the French, Italian, Belgian, Norwegian and Spanish markets.

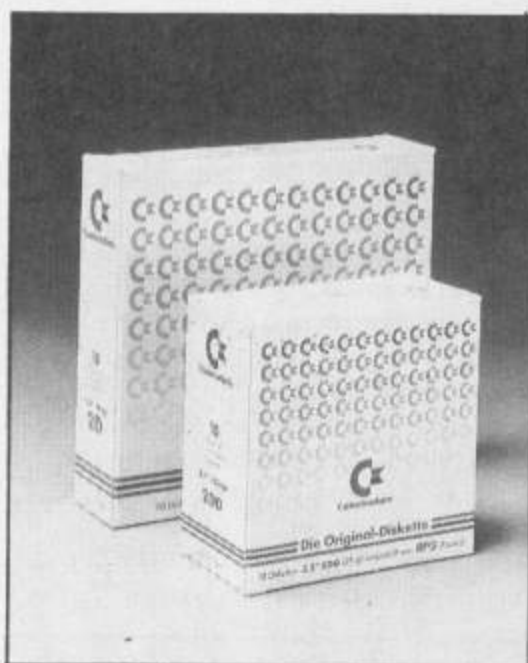
As holder of the marketing rights to the Commodore label in West Germany, RPS has signed the lucrative contract with disk wholesalers, Batavia. The deal was struck despite intense competition from German manufacturers but Batavia was especially looking for a supplier who would not be a competitor in the home market.

The 'High Focus' product range also accounts for 10% of the British market and RPS is keen to increase supplies from its factory based in Albi, France.

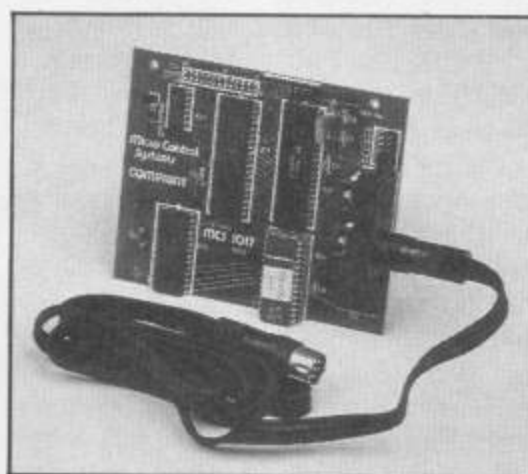
Touchline:

RPS: High Street, Houghton Regis, Bedfordshire LU5 5QL. Tel: 0582 867222.

Commodore: Commodore House, The Switchback, Gardner Road, Maidenhead, Berkshire SL6 7XA. Tel: 0628 770088.



The RPS/Commodore High Focus Range



The MCS Comprint buffer

Music to your Ears

Students studying for Music Grade Examinations 1-5 can practice for their aural tests with the aid of Aural, a musical program from Perfect Fourth Software.

Faithfully following the syllabus of the Associated Board of the Royal Schools of Music, the program is aimed at all serious instrumentalists or singers and includes a module which shows how to conduct in time to music. The program contains 250 tests, chosen at random, and eliminates the need to enlist the aid of a pianist to help you practice.

Perfect Fourth are taking great pains to underline the fact that this is not just another composer program. It has been designed to avoid the need for specialist computer skills and the specially commissioned fast loader from Trilogic enables a full memory load to take place in just over a minute from tape or 17 seconds from disk.

Touchline:

Perfect Fourth Software: 11 Hempstead Lane, Potten End, Berkhamstead HP4 2QJ. Tel: 04427 6311.

Trilogic: Unit 1, 253B New Works Road, Low Moor, Bradford BD12 0QP. Tel: 0274 691115.

The Missing Link?

The Comprint buffer interface from Micro Control Systems offers more than just an 8K buffer.

Connecting Commodore machines to non-CBM printers can be a headache but Comprint offers all of the necessary hardware to link the C64 and C128 to Canon and Epson printers. The device is easily installed inside the chosen printer and provides all the necessary connections for linking into the computer's serial port.

Once connected, Comprint will convert all of the Commodore's output into standard ASCII format and also allows access to the special features of the printer.

The prices are £34.99 for the 8K Epson unit and £44.99 for the Canon. Special reductions are on offer for the 2K buffer units and the new prices are £29.99 and £39.99 respectively.

Touchline:

Micro Control Systems: Electron House, Bridge Street, Sandiacre, Nottingham NG10 5BA. Tel: 0602 391204.

DATA STATEMENTS

The Big YC Binder Offer

At *Your Commodore* we've fallen victim to our own success. As the number of features and advertisements have increased over the past year, so has the number of pages been increased to cope with them. A few avid readers spent Christmas filing away their precious magazines and have pointed out that the *Your Commodore* binders no longer take a full year's magazines.

After pondering the problem for a few minutes, some bright spark at our Reader's Services Department came up with the perfect answer - make BIGGER binders! The miracle of the whole scheme is that they're still the same price and the same high quality

but make sure that your order states that you want the 1987/88 size.

As a New Year Goodwill to All Persons move (and to shift the backlog of smaller binders!) we are pleased to announce a special bargain offer. As long as stocks last, we are offering three of the old style binders for the price of two - after all you can always use them to tastefully camouflage that embarrassing collection of knitting patterns or as an outsize Filofax for exhibitionist Yuppies. OK, yaah!

If you want to take advantage of this limited offer, mark your envelope YC BINDER OFFER, enclose your cheque or postal orders for £11.90 (for three binders) made payable to ASP

Ltd and don't forget your name and address. Send your order to Readers' Services at the Touchline address at the end of this news item.

If you want the big binders mark your envelope YC 1987 BINDER and follow the instructions above remembering that each binder only costs £5.95.

Enjoy but please allow 28 days for delivery.

Touchline:

Your Commodore Readers' Services: 9 Hall Road, Maylands Wood Estate, Hemel Hempstead, Hertfordshire HP2 7BH.

Gateway Changes

Readers wishing to contact the Gateway Computer Club should note the new address and phone number given in our Touchline. Gateway has a membership of over 150 computer users and organises events at the Bob Hope Recreation Centre, RAF Mildenhall, Suffolk on the third Sunday of every month. Specialist groups such as Commodore users have their own meetings at other times during the month.

The current membership fee is £7 pa and this entitles you to receive a monthly issue of the 20 page Gateway Gazette. Anyone who requires further information can drop a line to Phil Herberer at the Touchline address.

Touchline:

Gateway Computer Club: 164d Radcliffe Road, Lakenheath, Suffolk. Tel: Eriswell 2363.

Vine Goes to Press

Tynesoft have recruited the services of leading sports' commentator, David Vine, to write the introduction to the booklet which accompanies the Winter Olympics '88 compendium.

Vine has been connected with the Winter Olympics for the past 20 years and his BBC programme, Ski Sunday, recently celebrated its tenth anniversary from the Winter Games location in Calgary.

Tynesoft are also inviting a lucky winner to enjoy a holiday for two at the Winter Olympics. All you have to do is to buy the game and place in order of importance eight qualities which are required of a No1 Ski-ing athlete.

The game is available now for the C64, C16/Plus4 and the Amiga.

Touchline:

Tynesoft: Addison Industrial Estate,

Blaydon upon Tyne, Tyne and Wear NE21 4TE. Tel: 091-414 4611.



David Vine - probably the most travelled commentator in the World.

Amiga News

New Amiga software and hardware is appearing daily. The user base over here is still not large enough to support any major British developments but the interest in acquiring British rights for American products is encouraging news.

The Amiga market is still growing and 1988 looks like being a good year if only something can be done about the price of the software.

The latest news from America is that the Scribble! wordprocessor, Analyze! spreadsheet and Organise! database have all been combined in a single package called The Works! As a

business package, this forms an attractive starter kit.

Publisher Plus is an upgrade of Publisher 1000 which now includes Postscript laser printer support software and it is currently being sold at a lower price than its predecessor.

For business or leisure presentations, TV*Show from Zuna Group can help the Amiga owner to put together a sophisticated slide show or live video presentation. Over 40 different wipes can be used to phase one image out as another is phased in on a timed basis or remote control.

Write & File is the latest

WYSIWIG wordprocessor with an integrated database, mail merge facility and spell checker. There is a wide range of fonts available in a variety of styles to give a professional look to your documents.

Further information on any of these products can be obtained from Brown-Wagh Publishing in California.

Touchline:

Brown-Wagh Publishing: 16795 Lark Avenue, Suite 210, Los Gatos, CA 95030, USA. Tel: 0101-408 395 5602.

Airborne Ranger

Here's your opportunity to get in on the action and become a Ranger in Microprose's new release

By Tony Hetherington



Whenever a bridge needs blowing, pipelines need cutting, plans need stealing or people need abducting the Americans call in their equivalent of the SAS – the Rangers. In the latest all action simulation from Microprose you are a Ranger, dropped behind enemy lines to take out enemy targets. There are in fact twelve missions that can be attempted in any order, or one after another in the campaign game.

The Airborne Ranger is sent on a variety of missions that can range from a diversion assault to a stealth attack where you musn't engage the enemy until the last minute. As with

all other Microprose games you have to use your brain as well as your joystick or you'll be cut down in a few minutes.

You can practise each of the missions with any Ranger or create a character that's stored on disk until he's needed to do a job. As your skill increases and missions are completed your Ranger will be promoted from a lowly private to the giddy heights of Colonel heaped in battle honours such as Commendations medals and even the Congressional Medal of Honour! However, if you're killed in action so does the character and you must start again from Private.

Each mission begins with the deploy stage in which an



aeroplane flies over the target area and down to the bottom of the screen where it drops you by parachute into the game. This is a crucial part of the game as it not only gives you a first look at the enemy positions but also allows you to drop three bundles of supplies on your likely route.

These supplies contain ammunition for your carbine, shells for your rocket launcher, grenades and first aid kits. As carrying too much equipment slows you down, you must try and drop the supplies when and where you'll need them. Once the parachute opens and you descend to the ground you're on your own until you reach the pickup point which is right at the top of playing area. Ahead of you lies enemy soldiers, your target, machine gun sites, minefields, bunkers as well as hazards such as barbed wire, unsafe ice and proximity mines.

Your first job is to check your equipment and see that by pressing a single key you can swap from your standard carbine to a knife for silent stealth attacks, rockets to take out bunkers from a distance, grenades to hurl at machine gun nests, buildings or troublesome troops or select a time bomb that can be set with a 5, 10 or 15 second fuses.

These are particularly useful as you can set a bomb with a 15 second fuse as a diversion to draw away the guards from your intended target. Next you should check the map (this also pauses the game so you have time to pick out the information you need) and plan your route taking in account that it's unwise, not to mention unhealthy to walk in front of too many bunkers when you could crawl along inside trenches and escape their fire. You should also check where the enemy have laid mines and avoid them, as it's all



to easy to step on one and end your game and your career while in a fight with some enemy soliders.

When you have your route planned you're ready for action. You can move in Airborne Ranger in three different ways as you can walk, run or crawl close to the ground. Running is obviously the quickest way to travel but you quickly tire and must walk or crawl to regain your energy where as crawling is the safest particularly through the trenches and is the best way to creep up on an enemy. However you can't spend the entire mission on your belly as you'll miss the rendezvous at the pickup point. Whatever your mission or your style of attack you will find that you'll improve your chances of success if you plan ahead and devise tactics rather than the 'blast everything that moves' Rambo style of play. You will actually creep up on sentries and knife them before they can sound the alarm, you will dive into trenches to escape the fire from a bunker before you aim, jump up and fire then drop down as you take it out with a rocket.



Each mission presents you with a new challenge that will keep your reactions sharp and on target for success. I found the most difficult missions to be the ones in which you must reach the target area without firing a shot. Otherwise this will either put other rangers at risk in the mission in which you must disable a SAM site or give the enemy time to get their aircraft airborne giving you no chance to destroy them, or give them a chance to kill the hostages or prisoners before you can free them. In these missions you may only attack with your knife and use stealth as your main weapon to get around the patrols and bunkers. However once you're in the top third of the area you can let them have it.

Superb graphics and intelligent enemy forces put you in the thick of the action in desert, temperate and arctic battlefields in a game that leaves other combat games firing blanks.

Touchline:

Title: Airbourne Ranger. **Supplier:** Microprose, 2, Market Place, Tetbury, Gloucs. GL8 8DA. **Tel:** 0666 54326. **Machine:** C64. **Price:** £1495 (Ca) £19.95 (D).

Originality: 8/10. **Playability:** 10/10. **Graphics:** 10/10. **Value:** 9/10.

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Official Commodore Business Centre



Communications Corner

Greetings comms fans! For obvious reasons things start to happen in the comms world at this time of the year so there's plenty of news.

By David Janda

A massive expansion of MicroLink is promised after a £1.50 million deal was signed with Telecom Gold. Derek Meakin, managing director of Database Publications which runs the service told *Your Commodore*, "We'd been talking about such a deal on and off for the last two years, but only speeded things up when the possibility of the price increases, since becoming a reality for other Gold users, became apparent."

In the deal MicroLink gets its own Prime 9950 computer which is reputed to be four times more powerful than the Prime 750s which are used on the rest of Telecom Gold.

Database are not saying exactly what new features will be implemented, but in a statement to the press Meakin said, "The new machine will give us much greater flexibility. It will allow us to provide a much faster service, introduce a variable charging structure to meet the different needs of our users, and make possible the installation of many new and exciting features."

Without a doubt, the 512 block character transfer charge has put off a lot of potential and existing users of Telecom Gold. Existing users of the MicroLink service will be looking for even greater value for money, and I hope that MicroLink are now in a position to deliver the goods.

Kermit

No, not the little green frog as seen on the Muppets, but a *new* file transfer protocol instead.

Kermit has been around for a few years, but has always been dwarfed by the very popular XMODEM file

transfer method. However it's now being used more and more here in the UK and public domain versions for all the popular micros are abundant.

Kermit is much more than a means of transferring files from A to B. It consists of a number of commands that allow you to configure your Kermit system in a variety of ways. This enables you to transfer any type of file you care to name.

There are two reasons for highlighting Kermit in this column. First, it's in the public domain which means that it's free of charge, and secondly, networks such as MicroLink are starting to use it.

Getting hold of a copy of Kermit for your Commodore machine, be it Amiga or C64, should present no problem. The Independent Commodore Products User Group (ICPUG) can supply members with a copy on disk, and I have found a version for the C64 on Compunet. The 'official' distribution centre for Kermit is at Lancaster University.

You can dial up their mainframe and download the HEX files and reconstruct the version on your micro, or send off for a version on disk (check online for details on how to do this).

If you intend to download a version from the University then call the Lancaster mainframe on 0524 67671. Once connected enter 'CALL KERMIT', the password is also KERMIT. At the system prompt '\$' enter 'SELECT C64' or 'HELP' or '?' if you need assistance. Entering 'SELECT C64' will log you into the directory for the C64 implementation, you can then use commands like TYPE and DIR to list files and directories.

If all this is a bit daunting don't panic! First download the ".DOC" file, logoff, then list or print the file. This will not only give you information on Kermit and how to use it, but what files you should have for your particular implementation - good luck.

As mentioned, MicroLink is currently experimenting with Kermit on system 72. I have been trying it out for a few months with varying degrees of success. Basically the implementation of MicroLink will enable you to upload/download files be they text or binary. You could send a program to a friend who lives across the country, or in another country by using email which is handy!

FT

Another file transfer system which is being used on Telecom Gold is FT. This is in fact none other than the popular XMODEM file transfer. At present FT is only available to those with corporate accounts although I believe if it proves to be a success then it will be made available to all Gold users - full details next month.

The Net Gets Musical

A new contributors area should be launched on Micronet by the time you read this. Called Music City, it will consist of news and features about computer music. One of the main attractions will be telesoftware download files for a variety of machines including the C64.

As we are all aware, there are

hundreds of music demos in the public domain. All the music demos of popular commercial music from records and films is breaking the copyright law, and Micronet has taken steps to ensure they don't do the same.

"Micronet has no desire to flout the copyright laws", said PR manager David Rosenbaum, "hence we have reached agreement with the Mechanical Copyright Protection Society over the matter of computer music files on Micronet."

What this means is that if a subscriber wishes to submit a music demo of a contemporary tune that is not of his or her own, then Micronet will pay a royalty to the MCPS; thus keeping everything above board.

Phil Godsell, Micronet's software manager is inviting submissions from all subscribers, and if the tune is good enough you'll get paid for it as well. Certainly the emphasis is on music produced on the BBC micro, because the Beeb is the largest group of users on the Net. However, as we are all aware the C64 is a far superior machine when it comes to producing dulcet tones, so why not submit your own composition?

Hayes Gets Cheaper...

Anglo computers who stock the Enterprise range of modems has submitted a new range of HAYES compatible modems for approval.

Called the Enterprise Turbo range, two models are due for approval real soon. Both models support V21 (300/300 baud), V23 (1200/75 and 75/1200 baud) and V23 half-duplex (1200/1200 baud). In the case of the Enterprise II Turbo V23 full-duplex (1200/1200 baud) is also supported.

The modems are full Hayes Smartcom compatible and have a number of extensions. These include a 60 entry user programmable telephone number store with auto ID and password facilities, auto-dial, full S-register display, and if you are connected to the Mercury network the automatic-dial to said network will be useful.

What's also interesting is the price. The Enterprise I Turbo will cost £149.95 (ex VAT) and the Enterprise II Turbo will cost £299.95 (ex VAT).

...And Smaller!

Digital Matrix, based in the West Midlands, is now importing a rather nifty device called the Discovery 1200P Hayes compatible modem. Features include pulse and tone dialing, CCITT and Bell frequency specifications, and 300/300 as well as 1200/1200 full duplex operation.

What's so special is the size and price! The modem is just a little larger than a packet of 20 cigarettes and costs only £99 (ex VAT)!! It should be noted that currently it's not BABT approved but *Your Commodore* understands that the modem will be submitted for approval.

A full review of the Discovery 1200P will appear in a future issue.

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Font Master 128

Could this be the ultimate C128 wordprocessor?

By Stuart Cooke

It is often forgotten that the C128 is an excellent 'work-horse', with a wide range of accompanying business/small business software available. In this article we look at the Font Master 128 which takes wordprocessing on this superb computer a step further.

Font Master 128 not only offers all of the normal facilities that you would expect in a good wordprocessor, such as headers, footers, changing layout etc, but also over 45 new character fonts. These allow the user to print text in styles ranging from Greek to Arabic.

Program Requirements

You can only use Font Master 128 on an 80 column display. C128 users who only have 40 columns will not be able to use the program. The wordprocessor is supplied on two disks, one of which contains the wordprocessor, other utility programs and a few fonts, and the other contains extra fonts. If you are lucky enough to have a 1571 disk drive, both single-sided disks can be copied onto one double-sided disk. It is worth pointing out that the Font Master disks are not protected which allows you to copy the program and place the original disks somewhere safe. However, a dongle (small circuit board) must be placed in the cassette port in order for the program to work.

A setup program is provided so that you can tell the program exactly what type of printer and interface you wish to use with the program. Over 100 different printers are supported together with all of the popular

interfaces. One good feature of this setup program is that it will tell you what switches need to be set on any interfaces in order for it to work with the program. The setup file also tells you what sort of performance you can expect from your printer when used with the package. Obviously a printer such as the Commodore MPS801 will not give as high a standard as something like the Star NL-10.

Entering Text

Font Master 128 is used like any other wordprocessor; text is typed in together with certain codes to specify print styles, layout etc. Most commands are entered through a combination of the CONTROL, SHIFT and Commodore keys. A help facility will show you what keys to press to achieve a certain function.

Combinations of the above keys are used to select commands which include:

- A new font
- A new print style (bold, compressed etc)
- Underlining on and off
- Tall character height
- plus many more.

One extremely useful function for foreign users is the ability to overlay one character with another, i.e. allowing characters with accents to be created. Your printer must support backspacing to make use of this facility.

Formatting

As well as the range of single letter

commands mentioned above, over 50 two letter formatter commands also exist. These commands allow you to select such things as:

- the length of the paper you are using;
- the size of the margins;
- turning on justified print;
- turning on centering;
- defining the contents of headers and footers;
- printing in columns;
- inserting graphics in text;
- plus many more.

The option of turning on proportional spacing exists together with a special set of tabulation commands that make sure the altered spacing when proportional is on, does not affect the layout of tables, etc. This is great when you want to produce high quality tables.

Pretty Pictures

You may have noticed that the above list of features mentioned graphics. Font Master 128 has the ability to include a picture created from another program within your text. More of this later. The picture can either be placed in your document with the text running over it or around it. The facility to reverse the picture (i.e. make a negative) also exists. You don't have to use a computer graphic in your text - you can tell the program to leave a blank square of a size that you specify, so that you can stick a picture in from another source.

Newspaper Style

Font Master 128 has the ability to

print in columns, just like a newspaper. The setting up of the column size is left to the user, the program handles everything else. If your printer reverse feeds the printer will automatically move the paper back to the start of a new column. If your printer doesn't reverse feed then it is up to the user to move the paper to the top of each column.

Input/Output

As you would expect from such a sophisticated package, Font Master 128 offers many input/output facilities. The user can load and save fonts to disk, up to nine fonts can be resident in memory, bring up a disk directory, send disk commands, and manipulate text.

Text manipulation commands include the ability to load and save files in both program format and sequential format. The ability to save and load in sequential format allows you to use text that has been produced by other wordprocessors or database programs. Text files can also be merged into existing text files and areas of text, rather than the whole document, can be saved out.

Mail Lists

The ability to use form files also exists within Font Master 128. As an example of a form file let's say that you had the same letter to send to 50 people – the only changes that you require on each letter will be the name and address. With form files you can set up a letter with special codes, indicating where you want information to go. When you print the letter the special codes are replaced by information from a form file, in our case the form file would contain the names and addresses of the 50 people that we were sending our letters to.

Seeing is believing

Once your document is finished it is nice to see exactly what you have done before you commit your prose to paper. A video preview option allows you to see the document on the screen just as it would appear on paper, including the changes in character size, font, etc.

Foreign Language

Font Master 128 comes complete with a variety of foreign languages so that your printout can be in Greek, Russian or even Arabic. One problem with this is the characters for foreign languages do not always correspond to English letters, and the screen display will therefore look rather silly.

Font Master 128 overcomes this problem by allowing you to load a new character set into memory. This means the characters that you see on screen will be the same as those on the printer. Font Master 128 is the only wordprocessor I know that has this facility.

Some foreign languages present even greater problems because they are entered from right to left. Fear no more, Font Master 128 allows you to type in and edit text 'backwards'.

Other languages are even more complicated in that text is written from right to left and numbers are written from left to right. Font Master 128 also makes provision for this.

Going Further

A variety of programs that are supplementary to the wordprocessor are supplied on the Font Master disk. All of these are accessed from a menu which appears when you boot the disk. I have already mentioned the setup file earlier in this article, a graphics convertor, font editor and text convertor are also provided.

The Graphics Convertor allows you to convert a high-res picture or a printshop picture into such a format that they can be used with the wordprocessor. Facilities also exist to make pictures up from a number of

images taken from printshop.

Should Font Master 128 not have a font to suit your requirements, then the Font Creator will solve your problems. This program allows you to design your own fonts for use on the printer and character sets for use on the video screen. The program has a variety of commands for editing fonts including loading, saving and dumping the fonts to the printer.

Because many people have access to other wordprocessors, a program exists called the translator. This program allows you to take text from a variety of popular wordprocessors and convert it into such a format that it can be loaded by Font Master 128. If your wordprocessor saves out sequential files then you will not require this option as the wordprocessor will load sequential files without any problem.

Verdict

Font Master 128 is the most powerful wordprocessing package that I have used. It has all of the facilities that you would require from any wordprocessor plus many more that you would never have thought to be possible. An important point worth noting is that you don't have to use the fonts, you can produce printouts in your printer's normal face.

A spelling checker should be available in the near future which will add that finishing touch to the package.

Font Master 128 is the most comprehensive wordprocessor that I have used on the C128, it's also one of the cheapest.

This package is an essential piece of software for C128 users.

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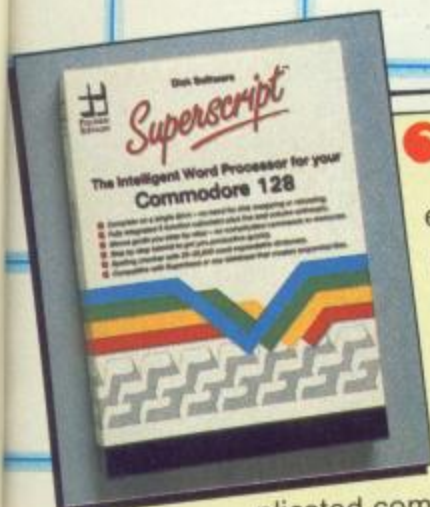
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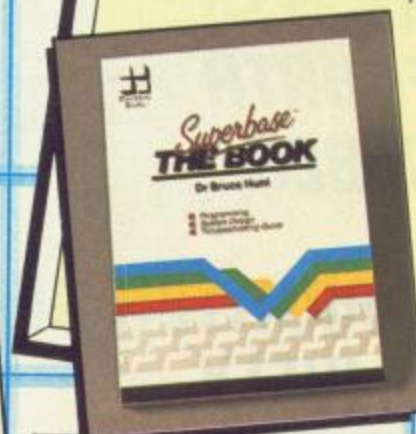
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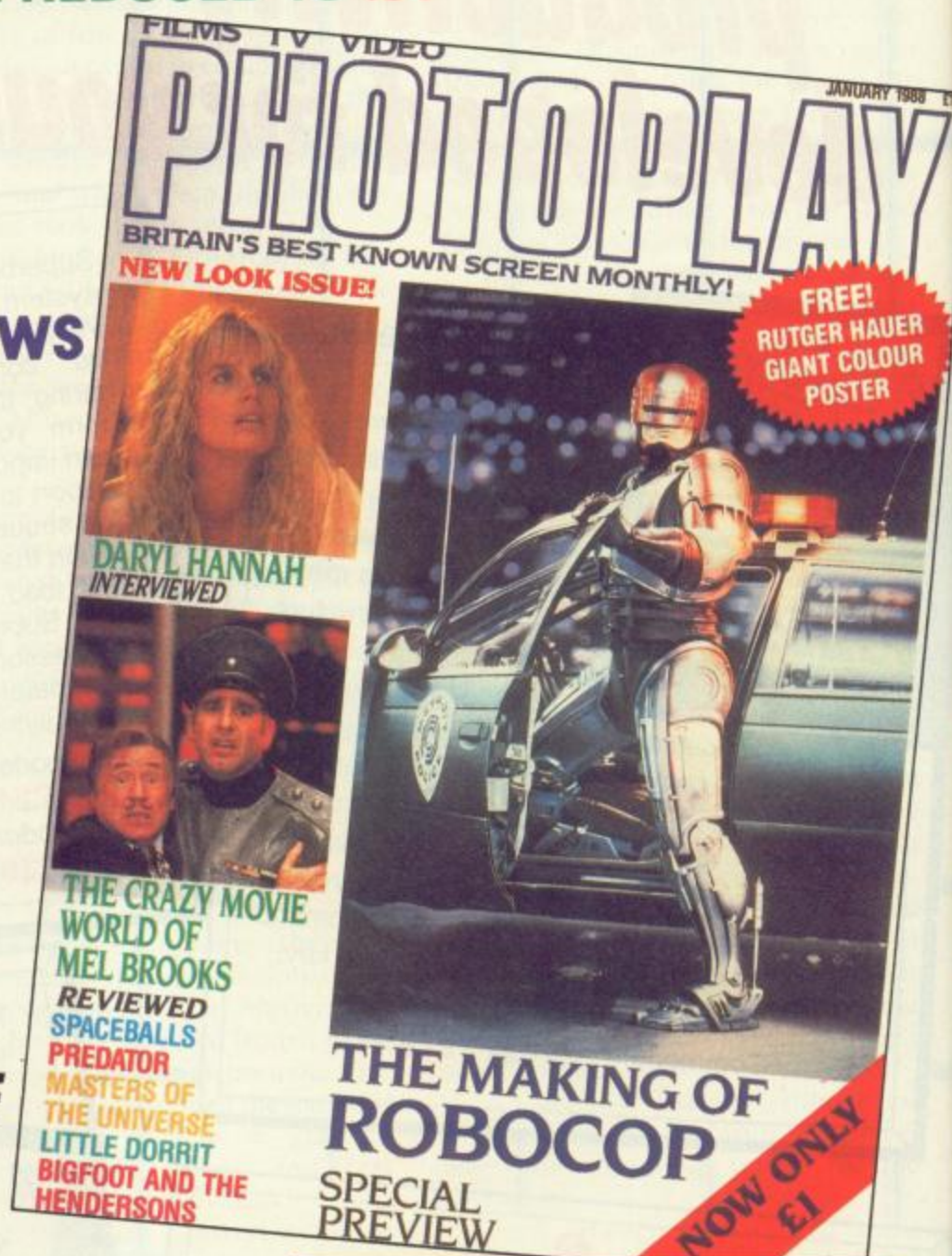
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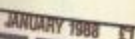
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Amending Commodore 64 Basic

Various avenues can be opened to the Commodore user when commands are added to 64 Basic. Peter Gerrard starts us off with simple background and border colour changes.

By Pete Gerrard

Ever since the Commodore 64 first appeared (and my, what a long time ago that seems to be) people have moaned and groaned about the version of Basic that it was equipped with. They complained of no procedures, which has always struck me as a rather pernicky argument when it takes five hours to search through a twelve page listing in order to find a four line procedure called Fred.

At least with a GOSUB 9000 you know where line 9000 is going to be! No structure to the language at all, they would whinge, ignoring the all-important fact that if a program runs and works, then it works, whether the code is a thing of beauty or something that exhibits the structural qualities of an origami butterfly in a thunderstorm. No commands for using graphics and sound, they whine, and there they have, a very valid point, at last.

There are two commands in the Commodore 64's repertoire for manipulating sound and graphics, and these are PEEK and POKE. Even PEEK isn't a great deal of help most of the time, since a lot of the registers used to handle these two admittedly important features of the 64 are write-only. That is, you can POKE things in there but you can't PEEK to see what you've already got. Write-only

memory, or WOM I suppose, can be a bit of a nuisance at times.

Now I'm not proposing surgery to your computer, since the write-only aspect of things can be overcome by judicious use of variables and a little something called logic when you sit down and write your programs.

What we can do, however, is improve the Basic language that Commodore have seen fit to equip us with.

There are many ways of going about this, but in this first article we'll start by taking a look at something that is fairly simple to follow (and implement!). It will give you the opportunity to muck about and alter in whatever way you please, and that leads the way for the greater things that are to come.

Just as you might expect Ed Moses learnt to walk before he began to run, then to master running before he started leaping about over hurdles (and yes I know he's been beaten at long last) so you too will have to jump in at the shallow end at first. To begin with, what are we looking for from our initial program?

Program Creation

We want to be able to do three things with a new command, and these are:

1) Allow Basic to accept a new keyword.

2) Allow that keyword to have parameters associated with it.
3) Act on the new keyword.

If one or all of these fail us then we will get nowhere, so the first step must be to see how Basic accepts the keywords that it already has, and how we might go about altering things so that it will learn to accept one of our new words as well.

Step One — Character Get Routine

Whenever you type something into your 64, everything is stored in memory as you type. It does not, as you might think at first, go into the keyboard buffer. Rather, it is stored somewhere else and (very cleverly) if a Basic keyword is encountered, it is tokenised as well.

In other words, one character replaces the five letters PRINT in that command, or another character might replace the four letters of POKE, and so on. A little memory saver, there. All this continues until you hit the RETURN key, at which point the Commodore 64 has to try and make some sense out of what you've just typed in. To do this it makes use of a routine known as CHARGET, short for CHARACTER GET, and this lives in memory from \$0073 to \$008A, and looks like this:


```

$0073 INC $7A
$0075 BNE $0079
$0077 INC $7B
$0079 LDA $021E
$007C CMP # $3A
$007E BCS $008A
$0080 CMP # $20
$0082 BEQ $0073
$0084 SEC
$0085 SBC # $30
$0087 SEC
$0088 SBC # $DO
$008A RTS

```

The part that concerns us here is the region from \$0084 to \$0088, combined with the fact that this is stored in RAM, not ROM (or WOM!), which means that we can alter it. So, with the aid of an assembler you might care to type in the following:

```

$C100 SEC
$C101 SBC # $30
$C103 SEC
$C104 SBC # $DO
$C106 RTS

```

Or, if you prefer a Basic loader:

```

10 FOR I=49408 TO 49413:READ
A:POKE I,A:NEXT
20 DATA 56,233,48,56,233,208,96

```

which would do the job equally well. Now, we can alter CHARGET so that the latter part of it reads like this:

```

$0084 NOP
$0085 NOP
$0086 NOP
$0087 JSR $C100
$008A RTS

```

or again, if you like a little spot of Basic:

```

10 FOR I=132 TO 137:READ
A:POKE I,A:NEXT
20 DATA 234,234,234,32,00,193

```

Now the routine will do nothing for a while before leaping off to our new machine code subroutine at location \$C100, which as you've seen, simply emulates the original code that was already in the CHARGET routine. So what's the point of altering it then? So that we can replace the three NOPs with a call to another subroutine. Before we do that we must learn one or

two other things, and CHARGET routine when altered is not a happy thing unless the code you put in yourself works perfectly, and works perfectly first time.

Commands and Parameters

You're probably all familiar with various concepts connected with altering Commodore 64 Basic. Use of interrupts (POKEing 788 and 789 with our new interrupt location), or the use of internal subroutines to accept parameters and acting upon them (JSR \$B7EE, STX \$D020 or wherever is one easy way of doing it). You'll be relieved to know that we're going to use none of this.

When you type something in, and CHARGET either accepts it as a valid expression within the frameworks of Basic, or chucks it out as something it's never heard of and probably never wants to hear of, what you have just typed in, is stored in memory. (In location \$0200 onwards, in fact, or decimal 512 if you prefer.) Now you can't check this just using Basic, since the contents of those locations obviously alter every time you enter a command to see what's in there, but that is where the information goes, believe me. Check it using interrupts if you want.

Say we want to have something known modestly as PETER for our new Basic keyword. To keep things simple, we'll just change the background and border colours for now, before we get onto more exotic commands later on in this little series. Obviously, then, we'll need to have the command use two parameters for the two colours, in the form PETER A,B. To give a concrete example, how about PETER 1,2? The content of location \$0200 onwards, if POKEd onto the screen, would reveal PETER 1,2 followed by whatever else happened to be in there from any earlier typing efforts.

You begin to see my point. The information is stored somewhere in memory, and it's up to us to dig it out and act on it. Let us, first of all, make sure that Basic will recognise our new keyword PETER. When we are convinced of that we have almost won this first, easy, battle in getting the 64 to accept new Basic keywords. We know where the parameters are stored, it then just becomes a question of getting them.

New Keywords

You'll have noted that CHARGET is already diverted to \$C100, and that the little diversion there finishes at location \$C106. Well we'll make use of the space after that to get our new keyword accepted.

To begin with, we'll need to store the values currently held in the three machine code 'variables', otherwise known as the X register, the Y register, and the accumulator. Then, we'll need to look at what is stored at location \$0200 onwards and see if the first five characters correspond to PETER.

Then, we can check for the parameters and cause something to happen. This means that we'll have to have a little table stored in memory with our new keyword in it (and when you've added more than one command you'll need to store the length of the new words as well, at least you will if you're going to be using this method). Finally, if the word found from \$0200 onwards is not a new word then we'll have to retreat to CHARGET to let it get on with its job of sorting out the existing Basic, without worrying itself over anything that we might get up to. The machine code instructions to perform these tasks look something like this:

```

$C107 STX $COFF
$C10A STY $COFE
$C10D STA $COFD
$C110 LDX # $00
$C112 LDA $0200,X
$C115 CMP $C130,X
$C118 BNE $C122
$C11A INX
$C11B CPX # $05
$C11D BNE $C122
$C11F JMP $C140
$C122 LDX $COFF
$C125 LDY $COFE
$C128 LDA $COFD
$C12B RTS

```

In order for this sequence of commands to operate properly we need to have the relevant information stored at location \$C130 onwards, so that the instructions at locations \$C112 and \$C115 can compare what has been typed in and stored at \$0200 onwards, with the sequence of values for our new keyword. So, at locations \$C130 to \$C134 we need the (hexadecimal) values 50, 45, 54, 45, 52,

which together make the letters P-E-T-E-R, as it is in this form that they will be stored at \$0200.

Then, we need some code at location \$C140 onwards, so that the program, having checked for the word PETER and found it present, has something to do to prove to us that this new word has been entered. To keep things simple for now, we might have something like:

```
$C140 LDA # $65
$C142 STA $0400
$C145 JSR $A474
```

In Basic loader form, these two sequences of instructions look like this:

```
10 FOR I=49415 TO 49451:READ
A:POKE I,A:NEXT
20 FOR I=49472 TO 49479:READ
A:POKE I,A:NEXT:END
100 DATA
142,255,192,140,254,192,141,253,192,
162,0,189,0
110 DATA
2,221,48,193,208,8,232,224,5,208
120 DATA
243,76,64,193,174,255,192,172,254,
192,173,253,192,96
200 DATA
169,101,141,00,04,32,116,164
```

The program works as follows. After storing the values for the X and Y registers and the accumulator, it looks at the value currently held at location \$0200 and compares it with that stored in our table at \$C130. If the two are not equal, it branches out of this check immediately and races back to CHARGET to get on with the job in hand. If they are equal, then we loop around to check the value currently held at \$0201 against that at \$C131. Again, if they aren't equal then CHARGET is allowed to get a look in, but if they are we continue around the loop until we're comparing \$0204 with \$C134.

If those two are equal then the word that has been typed in matches that stored in memory as our new keyword and program control can branch off to the code starting at location \$C140. This just puts a heart in the top left hand corner of the screen, but at least it proves that the command has been recognised. All that remains now is to put some additional code at \$C140 to allow for

parameters, and then to act on those parameters. This is the easiest part of all, since we're only altering the background and border colours.

But first, we must inform CHARGET of what's going on, so we'll have to replace those NOPs that we put in earlier with something a little more sensible. Like this:

```
$0084 JSR $C107
```

or

```
10 FOR I=132 TO 134:READ
A:POKE I,A:NEXT:END
20 DATA 32,07,193
```

Now CHARGET is diverted first of all to \$C107 to check for the new keyword, and if it is found then a program operation is carried out and control returned to the normal Basic 'ready' mode by use of the internal ROM routine starting at location \$A474. Otherwise, back to CHARGET and the routine that has now been copied into locations \$C100 to \$C106, and the 64 can carry on as normal.

The code at \$C140, allowing for parameter passing and acting on those parameters, looks something like this:

```
5 B=0
10 FOR I=49408 TO 49561
15 READ A:POKE I,A:B=B+A
20 NEXT
25 IF B <> 21046 THEN PRINT
"data entered incorrectly — please
check,":END
30 PRINT "all present and correct -
well done,":END
100 DATA
56,233,48,56,233,208,96,142,255,192
105 DATA
140,254,192,141,253,192,162,0,189,0
110 DATA
2,221,48,193,208,8,232,224,5,208
115 DATA
243,76,64,193,174,255,192,172,254,
192
120 DATA
173,253,192,96,255,255,255,255,80,69
125 DATA
84,69,82,255,255,255,255,255,255,255
130 DATA 255,255,255,255,173,5,2
201,32,208
135 DATA 80,173,6,2,141,128,192,
173,7,2
140 DATA 201,44,240,34,105,9,141,
32,208,173
```

```
145 DATA 8,2,201,44,208,32,173,9,2,
141
150 DATA 129,192,173,10,2,201,0,
208,37,173
155 DATA 129,192,141,33,208,32,
116,164,13,128
160 DATA 192,141,32,208,173,8,2,
141,130,192
165 DATA 173,9,2,201,0,208,9,173,
130,192
170 DATA 141,33,208,32,116,164,
105,9,32,140
175 DATA 193,32,250,173
```

You'll notice that we've included the whole code here, rather than just bits and pieces. This explains the presence of some bits that you've already seen. However, it is a lot easier (and a lot less confusing) to say 'type this in' rather than 'type in the bit from that memory location to that one, altering this bit, and changing that to ...'. It might mean a shade more typing, but at least you're more certain of getting it working first time!

The command will now accept things like PETER 0,1 for a black border and a white background, or PETER 10,10 for a pink border and a pink background (very nice). I freely admit that the checking for the various parameters is not as robust as it might be, and you might care to take a look at that when you're examining the workings of the whole thing. You might also care to add one or two new commands of your own, but remember that a) commands cannot incorporate existing keywords, so that BORDER for example is not allowed, since it includes the word OR, and b) commands added in this fashion cannot be tokenised, or abbreviated.

In conclusion, this is just one way of adding new commands to the C64's repertoire. Next time we'll look at another way of doing things which makes it a lot easier to add more than just the command, and which doesn't rely on tedious error checking to get the parameters sorted out.

So, until then, your homework (let's look through the round window children) is to tidy up that error checking, and perhaps add some commands of your own so that you can gain some familiarity with the workings of CHARGET and indeed the Commodore 64. Me? I'm off to watch some of the Test Match. Bye for now!

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Ackroyd's Saga

Continuing our learning tables routine we take a look at changing the positions of the nasties and key portions

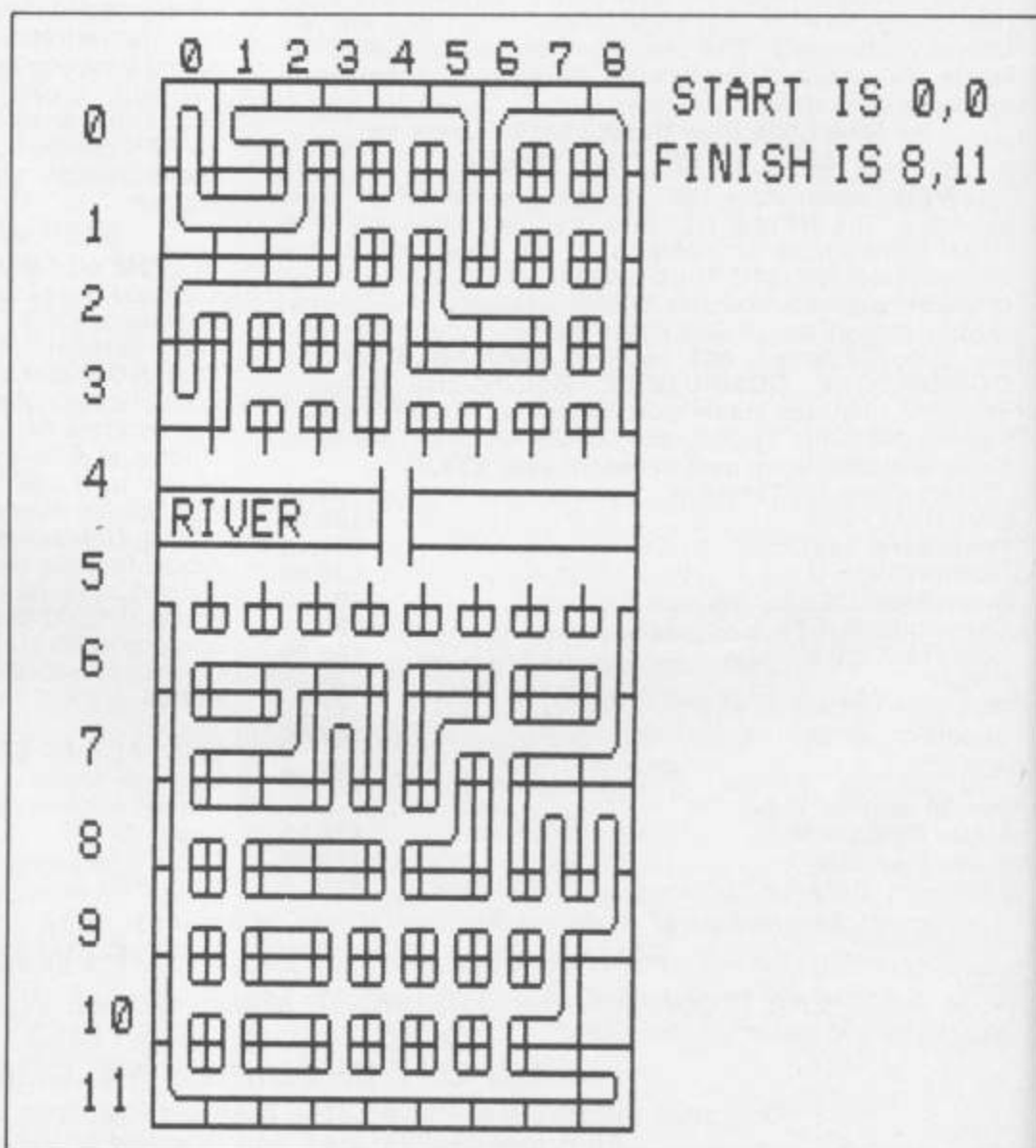
By Allen and Margaret Webb

In the BASIC loader, we provided the options to alter the response time and the number of questions you needed to answer. In the final part, we will teach you how to change the positions of the nasties and key portions and thereby change the game.

As you can see from the map, the play area occupies 108 squares on a 8 by 12 matrix. Each square can have any of four exists open. The play starts on square 0,0 and the end point is on 8,11. We are using normal co-ordinates where the first number is the X co-ordinate or the horizontal position. The second number is the Y or vertical position. The 0,0 position is therefore the top left hand corner. Try playing the game with the map in front of you and you'll soon get the idea.

The position of any nasties is held in two tables in the code. Positions by altering these values, you move nasty. The BASIC program does all this for you. The editor allows you to load up the relevant block of code (we called it OBJECT 2). You can then rearrange the game to your satisfaction. When you choose the exit option, it allows you to save the modified code.

Although it forms part of a two part game, Ackroyd's Saga can also be played independently. If any of you have any comments on the game, please let us know via the magazine.



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Through the Round Window

Do you C64 and 128 owners dream of having access to windows, icons, mice and windows? Now the answer is here in the form of a Window Environment Operating System.

By Rony van Hove and Bant Duchesne

Nowadays, when you hear about WIMPS (windows, icons, mice and pull-down menus or windows) the machines which spring to mind are the Atari ST, Amiga, Apple IIGS, Apple MAC and IBM/PC. But what about the 8-bit world?

A few packages for the Apple IIC have been seen but never for our Commodores 64s or 128s. That was until the magic name of Berkeley Softworks appeared with their introduction of GEOS. It lived up to its claims, but alas for cassette users it was still a dream.

Well folks – the answer is now within reach. I proudly present the

WEOS (Window Environment Operation System) with WEOBASIC. It's a form of a Basic extension which will enable you to access the magnificent world of WIMPS. And now for the bad news – you'll have to drop the *icons* because at the moment it's impossible to incorporate them (hardware reasons).

However, I'm working on an icon extension (with raster interrupts). If you do want icons, check some back issues of *Your Commodore* for Allen Webb's article on WIMPS.

So now all you need to do is type in almost 8K (!) of machine code – read on!

All commands and functions are listed as below:

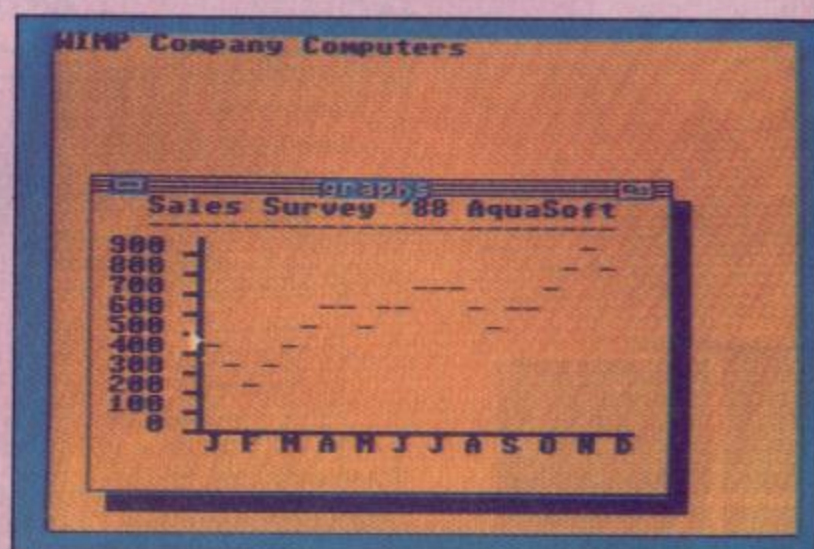
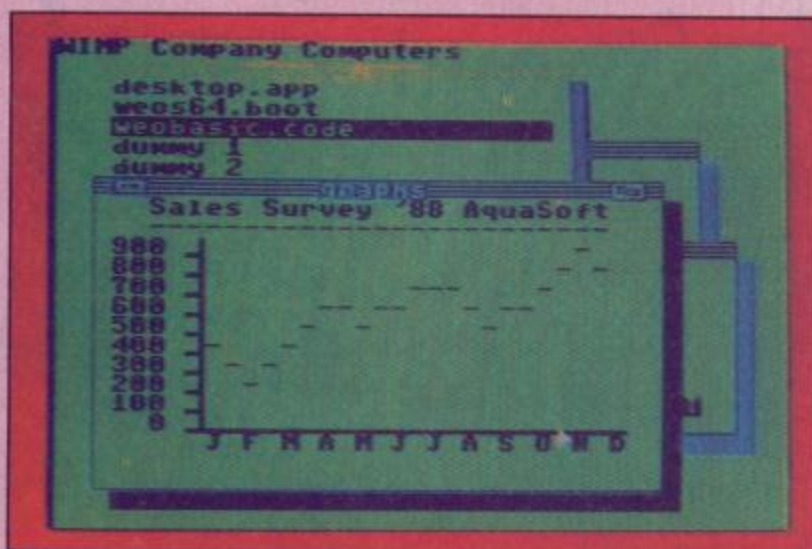
Syntax: well, everyone knows what I mean.

Mode: this can either program or direct or both (all).

Output: this is screen or windows. Description and examples.

The windows fall into three categories:

- All purpose window (APW). Four of these can be opened up.
- Static window (SW). Only one window is allowed.
- Pull down menu (PDM). You can only open one of these at the same





time but you can define up to eight PDMs.

You can open up to five windows (four APWs plus one SW or PDM). You can use any nine DIN mouse (e.g. Reishware mouse, Amiga mouse and ST Mouse) or use an ordinary joystick. Just stick in port two and WEOS will do the rest.

Starting up WEOS

Use SYS 64738 or reset your computer. If you own a Commodore 128 you must go to 64 mode. The following message is printed in green letters on a black screen:

```
WEOBASIC 1.0
WINDOW ENVIRONMENT
OPERATING SYSTEM 4.0
(C) 1987 RONY VAN HOVE
(C) 1987 ASP LTD.
31743 BYTES FREE
```

Before I continue you should understand the following:

- We are working in BANK 3 instead of BANK 0.
- BASIC starts at 32768.
- BASIC TEXT STARTS AT 1024.
- Screen starts at 52224-53223 (CC00-CFE7).
- Character set resides in 57344-61439 (E000-EFFF).
- PDM/SW buffers are in 61440-65535 (F000-FFFF).
- PAW buffers are in 40960-49151 (A000-BFFF).
- Free use in 49152-52223 (C000-CBFF).

Never use address FB-FE, 2A7-2FF (parameter block one) and 33C-3FA (parameter block two, however this is a temporary block because most data is, after manipulations, flushed to parameter block one).

• Character codes 91-124 are redefined (also the inverse codes), so don't worry if you see some strange codes on your screen.

• If your basic program has crashed and you press reset or SYS 64738 for strange on your screen, but don't worry.

• If you're basic program has crashed and you press reset or SYS 64783 for the second time, your screen will contain strange things, but don't worry! However your program cannot be recalled with OLD, because after a reset the system is set first to BANK 0, and since the screen resides in 0400-07E7, your basic program is damaged, so when you come back in BANK 3, you can't OLD it again. (So save your magic masterpieces before you try.) The WEOBASIC commands and functions:-

CPOS

Syntax: CPOS (f1).

Mode: all.

Output: window.

CPOS-reads the cursor position in a window.

When f1=0 it reads the current x-position.

When f1=1 it reads the current y-position.

When there are no windows on the screen CPOS will return wrong values.

COLOUR

Syntax: COLOUR re,co (where re=0-2 and co=0-15)

Mode: all.

Output: all.

Selects the colours where re can be:

0 for the border colour

1 for the background colour

2 for the foreground colour

CLS

Syntax: CLS

Mode: all.

Output: all.

Performs a clear screen (= PRINT CHR\$(147);).

CURSOR

Syntax: CURSOR x,y (x=0-39 and y=0-24)

Mode: all.

Output: all.

Places the cursor at the specified screen/window co-ordinate.

INVERSE

Syntax: INVERSE x,y (x=0-39 and y=0-24)

INVERSE, x,y,xl (x and y as above and xl=1-40).

Mode: all.

Output: all.

This instruction inverts a specified length (xl) at a specified position (x,y). If no length is given the default of 1 is taken.

IF

Syntax: IF condition THEN...

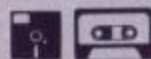
IF condition ...

Mode: all.

Output: all.

This is an enhanced version of our C64s IF instruction. In the normal case the condition can be followed by a GOTO or a THEN. But I decided to change it, the result being that you can put any instruction after the condition. e.g.: IF X=2 A=2 is the same as IF X=2 then A=2

IF Z=0 or SGN(y) PRINT " fun,fun"
Note: never put a line number after the condition (GOTO).

**SCRN**Syntax: `x=SCRN(x,y)` ($x=0-39, y=0-24$)

Mode: all.

Output: all.

Returns the screen POKE code of the specified location on screen/window.
 e.g.: `10 CURSOR 1,1:PRINT "A"`
`20 IF SCRN(1,1)=1 PRINT "IT WAS 'A'"`

The sprite for the pointer is predefined and is built in WEOS. WEOS has in fact three predefined sprites, more info by the MOVBLK command.

e.g. `POINTER ON: POINTER 47,3,2,2:MOVBLK 0,47` And if you move your mouse/joystick you can move the pointer.

```
47,2,3,3:MOVBLK 0,47
```

```
20 SOPEN 25,10
```

```
30 CLS:WPRINT "SX="MOUSE(0);
```

```
"SY="MOUSE(1)
```

```
40 WPRINT "MX="MOUSE( 0);"
```

```
MOUSE ( 1)
```

```
50 PAUSE 1:GOTO 30
```

After you typed it all in, you will see a static window with flashing information. The first two gives you the screen co-ordinates and the other two the window co-ordinates. As you will see every out of range gives you a negative answer. (-1).

This is quite a handy instruction for multiple choice menus. Use this together with INVERSE and you'll get a very professional look. Study our DeskTop program for a very good result. (Selection of a file.)

PAUSESyntax: `PAUSE x` ($x=0-255$)

Mode: all.

Output: all.

Output: all.

Pauses the program x times (1 unit pauses 5/14 secs)

If $x=0$ it waits for a keypress.

e.g.: `10 PRINT "Hit a key": PAUSE 1`
`20 PRINT "QUICK HEY!!?": PAUSE 1`

`30 PRINT "STRANGERS IN THE PRINT "STRANGERS IN THE NIGHT":PAUSE 255`

MOVBLKSyntax: `MOVBLK source, destination` (both 0-255)

Mode: all.

Output: all.

As mentioned earlier, the system has three predefined sprites but you can add seven sprites of your own which will be always in WEOS if you save or load it again. The first para refers to the system spite nr., the second refers to the destination pointer (you can only use 0-47, since 48-63 are in the screen area and 64-255 are behind KERNAL and the I/O chips). The following sprites are incorporated:

0 : pointer

1 : hook 1

2 : hook 2

3-9 : free use

To define system sprites 3-9 POKE in your data from 39969. Each sprite must contain 64 bytes as usual Now save your new version of WEOS on a separate disk or cassette.

e.g. look at pointer.

OLDSyntax: `OLD`

Mode: direct.

Output: all.

Everyone knows this command.

BUTTONSyntax: `x=BUTTON`

Mode: all.

Output: all.

Scans the trigger of joystick or the left button of your mouse. When you don't press the button it will return a 0 otherwise it will return a 1.

e.g. `10 IF BUTTON=1 PRINT "FIRE..FIRE":GOTO 10`

WEOSSyntax: `WEOS x` ($x=1$ or $x=2$)

Mode: program.

Output: all.

Because the complex structure of this statement I could not find a logical name. It simply does so much. WEOS works in conjunction with the pointer.

DESKSyntax: `DESK i` ($i=0-225$)

Mode: program only.

Output: screen only.

This is a rather unusual command. It performs a total initialisation of your computer for a desktop application, i.e. the screen will be filled up with the specified code (i) (mostly $i=94$, because this is the desk pattern) and the upper row of the screen will be cleared and filled up with the PDM-headers. All opened windows will be removed.

DIRSyntax: `DIR`

Mode: all.

Output: screen.

Displays the directory of device 8 drive 0 on the screen

When $x=1$: Each time WEOBASIC performs this instruction it scans the whole screen for special symbols if any, inverts them and a whole series of information in the system is then updated (which you can read later by the necessary function provided by the system).

MOUSESyntax: `x=MOUSE`

`y=MOUSE(p)`

`z=MOUSE(p)`

Mode: all.

Output: all.

MOUSE returns the direction of the current movement of the joystick/mouse ($x=PEEK(56320)AND 15$)
`MOUSE(p)` where $p=0$ or 1 . Returns the position of the pointer in a WINDOW ($x=0-39 y=0-24$).

`MOUSE(p) p=0-1` : same as above but now position on the screen.

$p=2-3$: returns x and y acceleration.

$p=4$: return pointer colour.

Try this:

`10 POINTER ON:POINTER`

When $x=2$: It does exactly the same as above but now it also scans for menu handlings at the upper row (DESK must be executed first, otherwise it has no affection). If the pointer points to a menu header and you press the button, the header will be inverted and the menu is pulled down. The system will now wait until you have selected an option and then return to BASIC. However if you go to another heading the current menu will pop up and the system will return to BASIC, e.g.

```
10 DESK 94
```

```
20 POINTER 47,3,2,3,:POINTER
```

```
ON:MOVBLK 0,47
```

```
30 WOPEN 1,2,30,10,"WEOS
```

```
DEMO",3
```

```
40 WEOS 1:GOTO 40
```

POINTERSyntax: `POINTER ON`

`POINTER OFF`

`POINTER po,co(xs,ys)`

Mode: all.

Output: all.

Pointer initialises the pointer, po is the sprite pointer (more info about pointers in your C64 reference guide) and co is the colour. The next two paras are optional. The first specifies the x acceleration and the second (ys) the y -acceleration (only between 0-8).



Run it! An APW will appear on your desk and a pointer; when you move the pointer to one of the special symbols (the two symbols at both edges of the window), press the button and you will see it will be inverted! Try to point for the second time to the same special symbol again - you will notice that it won't be inverted back. The reason being that the system assumes that after you have pointed to a symbol it has to execute a user-defined piece of program. But how to invert it again so that it is back to normal? Well, that's not so difficult; you simply replace them with the normal codes (full list of symbols is listed in table 1).

Syntax: RUN
Mode: all.

Output: all.

This RUN does exactly the same as the normal RUN command, but it changes some registers. The result is that the normal RUN-token is not the same as the minor changed RUN, the new token is 238 directly followed by 1. (The first code is necessary the WEOBASIC as this is the sign for an extended instruction.) This also means that if your old programs contain any old Run statements you have to retype those statements after you loaded your program in WEOBASIC.

WINDOW

Syntax: x=WINDOW(wd)

Mode: all.

Output: all.

This function only works in conjunction with WOPEN; WCLOSE; WSWAP; WMOVE and with any other window command. wd can be: 0 - WINDOW will return the current window no - 0=no window on screen

1-4 APW window no.

5 SW

6PDM

1 - current window's x-position

2 - current window's y-position

3 - x-length of window

4 - y-length of window

5 - shadow flag

N.B. when there is no window in action the function will return a negative answer (-1) except for WINDOW(0) which will return a null(0). We use this command in our desktop program for moving and copying windows.

DISK

Syntax: DISK

DISK a

Mode: all.

Output: screen only.

DISK displays the disk status (if you don't know again why the red led is flickering).

DISK a sends a disk command to device 8 drive 0 or 1. When no disk drive is connected to your C64 the system will ignore the command and continue with the rest of the program N.B. when you want to read the disk status and you have no disk drive the system will hang up (RUN/STOP+RESTORE). This instruction will not work correctly with all disk drives.

WCLOSE

Syntax: WCLOSE

Mode: all.

Output: all.

This statement will close the current APW; when no window appears on screen, nothing will happen. If there are more windows on your screen, the last opened will be closed. The two special symbols on both edges of the window will be placed on the previous window, and the next screen command will work on that window (e.g. WPRINT or CLS). When there is another type of window on the screen (e.g. a static window) it will cause an

error, e.g.

```
10 WOPEN 1,1,20,16,"WEOS":
WOPEN 6,7,9,3,HEY",7
```

```
20 PAUSE 0:WCLOSE:PAUSE
0:WCLOSE
```

SCLOSE

Syntax: SCLOSE

Mode: all.

Output: all.

Closes a SW, when SW is present on the screen no error will be printed. If there is still an APW window on your screen it will be activated after closing the SW (you can see this by the two symbols appearing on the window), e.g.

```
10 SOPEN 12;6:PAUSE 0:SCLOSE
```

WPRINT

Syntax: see PRINT)WPRINT does the same)

Mode: all.

Output: windows (APW & SW)

Almost the same as BASIC v2 print instruction. You can use both SPC and

TAB functions as well as other characters such as ';' or ',' or BASIC variables, e.g.:

```
WOPEN 1,1,30,10,"DEMO FOLKS"
followed by :WPRINT "YC,THE
BEST";:WPRINT"WHO else?";
"NO..."::WPRINTTAB(7)"MIX it
"SPC(5) A"=?"
```

When the window is full, it scrolls everything up. Of course, a window must be opened first.

MENU

Syntax: MENU mn ON

MENU OFF

MENU mn,xl,op,sp,menu (,mc(,wc(,sh(,sc)))

x=MENU (y)

Mode: program.

Output: all.

Probably one of the most powerful commands of WEOBASIC. - MENU mn ON (mn=1-8) opens a menu with the options. When the specified menu is not yet defined an error message will be printed. When you try to open a menu and the DESK command is not yet performed every menu will be opened at position 0, e.g.

```
10 MENU 1,10,2,1"DEMO OPT1
OPT2 "
```

```
20 MENU 2,10,2,1"DEMO2 OPTA
OPTB "
```

```
30 CLS: MENU 1 ON: PAUSE
0:MENU 2 ON
```

When you run it, a menu will appear on the screen however without the 'header' DEMO and when you press a key, the menu will disappear and another menu will appear, again without a 'header'. Also the second menu is pulled down where the first one was pulled down. You can understand that this is certainly not a professional way to use pull downs menus. Delete line 30 and add this one: 30 DESK 94: MENU 1 ON: PAUSE 0:MENU OFF:MENU 2 ON

Run it! You will notice that everything is alright now the headings will appear, also inverted.

MENU OFF: operates just like WCLOSE or SCLOSE, the menu will be popped up and if there is an APW on the screen it will be activated (the two symbols you know!). If a static



window is opened and you try to pull a menu down an error message will be printed.

MENU: the third variation of MENU gives you the possibility to define a menu. The definition is always in program mode:

mm... menu no. (1-8)
 xl... length of menu window (3-40)
 op... number of options (1-20)
 sp... spacing flag (0 for no, 1 for yes)
 menu... contents the menu options data
 mc... colour of menu text (0-15)
 wc... window colour
 sh... shadow flag (0=no, 1=yes)
 sc... shadow colour

Well, well this is a lot of information! The first para is the menu which must be defined. If the mn is out of range a friendly MENU SYNTAX error is printed. When you define it, the new data will overwrite the old one. The next para defines the number of options. 'sp' is the space flag, when you say yes the maximum allowed options is divided by 2 (so this means not 20 but 10 options)

The difference between those variations is shown by the next demo.

The difference between those variations is shown by the next demo. Delete lines 20 and 30 of above and modify 10 by:

```
10 MENU 1,10,2,0,"DEMO OPT1
   OPT2 "
```

You will see that the options are directly printed under each other. When you change the 0 in line 10 to 1 and RUN it again you will see that there is a space between the options.

The following para is the most important; this contains all menu text data which must be printed in the menu. The very first name is the menu heading which is followed by a left arrow (this indicates the end of the first name) and is directly followed by the name of the first option and again followed by a left arrow. Use a left arrow after each name and if you have finished your string type an up arrow. The previous demo illustrates the use of the string. DO NOT USE CONTROL CODES IN THIS

STRING!! Remember to add as much options in your string as there is specified by the 'op' para.

The next paras are optional; 'mc' indicates the colour of the menu text but not of the header! The next one is the colour of the window, then comes the shadow flag. When this is set to 1 a shadow will be added to the menu. You have a choice when it comes to specifying the shadow colour. It is interesting that when you type a comma directly after another the system will use default values, e.g.

MENU 1,20,2,0,a\$,2 (text colour is red)
 MENU 1,.....,1,3 (text colour is white, and window is cyan)
 MENU 1,.....,2,3,1 (all as above but with a shadow)
 MENU 1,.....,3,,1,2 (cyan for text, foreground colour for window and red for shadow)
 MENU 1,.....,6,,0 (uses blue for text, foreground colour for window and no shadow)
 but... this is wrong: MENU 1,.....,4,2,,1 the reason is simple - the default for the shadow flag is no shadow so you can't define a shadow colour.

To be continued

It's easy to complain about advertisements. But which ones?

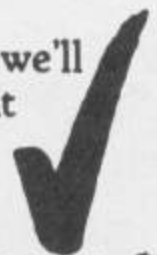
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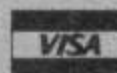
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The ICPUG Column

*The latest views from the country's biggest Commodore
user group.*

By Tim Arnot

I don't know about you lot, but I quite enjoyed the PCW show. Not because there was a lot to see – there wasn't. But rather because it was an opportunity to meet people and talk to them.

The first impression everyone has of the PCW show is its size. It's BIG, spanning both Olympia 2 and the National Hall. It took me three days to see the whole show during my off-duty periods from the ICPUG stand, and I'm not convinced even now that I saw all there was to see.

Having looked around, there was nothing on display that was new or really exciting. I shall now qualify that. There were two stands that were worth visiting because their products are, I feel, significant. The first stand was Mitac, in an obscure corner of the business section, they had an incredibly cheap 386 micro (1800) running a transputer card, and driving a Mitsubishi 19 inch EGA monitor. Now, transputers are one technology where Britain leads the world, but if we don't invest in them heavily, the Americans will take away that lead. However, that 19 inch monitor I could really use.

The second stand that impressed me (and I don't know if I should say this in a Commodore magazine) was the Acorn stand. Archimedes uses the same basic RISC technology as the transputer, and it doesn't half shift. However I think Amiga is better. At

the end of the day, what counts is boxes out of the door, and Acorn just doesn't have the marketing power to compete in the global marketplace.

Back now with the 'good guys'. Commodore had a 'village' in what was ostensibly the National Hall restaurant. It was a nice parochial affair, tucked away in a little backwater. I guess people can't help comparing it with Atari's "world", noticing the vast difference in size, vendors and popularity. I reckon Commodore need to get out of their 'village mentality'. It takes more than a village and a football team to conquer the world.

Speaking of football, I guess everyone knows that Commodore have spent 1.2 million in sponsoring Chelsea. During the show, 'selected guests' were invited for a tour of the ground and a pep talk by this month's CBM top management. Whilst being 'peped', I spoke to Mike Hambley, Commodore's Technical Support Manager. The newly launched PC-1 is, it seems, an Amiga A2088 Janus card turned on its side with a display adaptor, ports, keyboard and disk drive bolted on. Further interesting possibilities are opened up by the fact that the disk expansion socket is the same as the Amiga disk socket. While no expansion slots as such, there is an 'expansion connector' that looks remarkably like the male version of a slot. So all you need is a gender bender.

Unfortunately, Mike was unable to confirm this supposition at the time.

Commodore raved about their new range of brochures, that were not actually available to the public. The A2000 brochure was their pride and joy, and yes, it was impressive. Get one off Commodore and start dreaming, the A2000 may be Commodore's new flagship, but the beloved C128 is notable by its absence. When asked, the Commodore reps just changed the subject. I hope it was purely oversight, because I'd hate to see the C128 dropped.

As I'm about out of space, it really just remains for me to thank, on behalf of the exhibitions organisers, all those volunteers who helped on the ICPUG stand, and everybody who turned up or otherwise contributed towards making PCW a very enjoyable event.

Membership Details

For more information on ICPUG you should write to:

Jack B. Cohen
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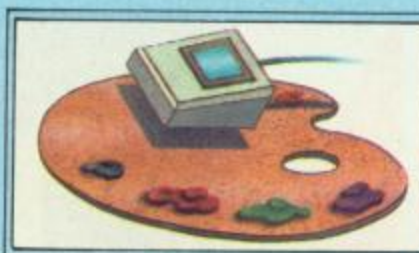


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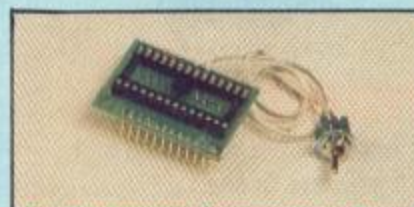
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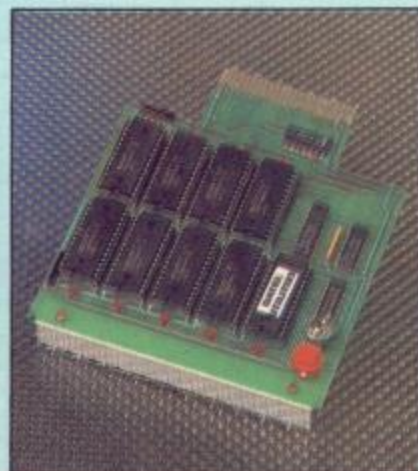
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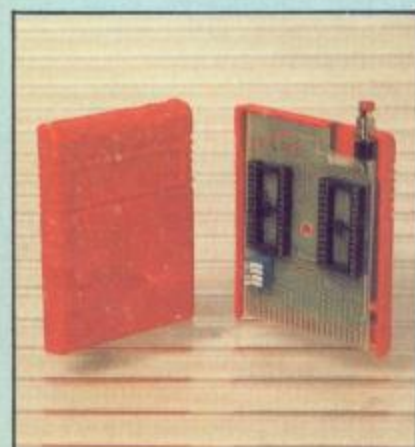
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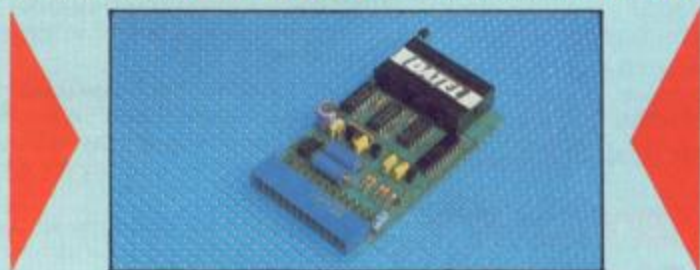


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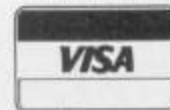
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Ultra Function Keys

Use the function keys to store seven screens of instructions without limiting your Basic memory!

By Geoff Hackworth

Commodore blessed the C64 with eight function keys, but in their infinite wisdom, they totally neglected to include any support system. My program provides such a system which allows you to store data which can be recalled to the screen at will. Before you say that you've seen all this before, look at the size of the program and you'll realise that it is no ordinary function key utility.

Most programs will only allow each key to produce a string of about eight characters. With this program you can store up to 998 characters on each of the first seven keys, the f8 key being reserved for the UFK Editor. The Editor allows you to 'program' the other keys and view a 117 character description of the task stored on each of them.

The Editor is very simple to use and is very similar to the screen editor built into the C64's operating system. Most characters may be stored by the Editor except for the colour and RVS ON or OFF symbols. There are also some special symbols for use within the stored data which perform specific tasks.

All the information stored on the keys may be saved and reloaded by two simple SYS commands.

Storing 2Kb of information may seem a bit memory consuming but the machine code and its variables are stored from 49152 to 53105 and the descriptions are stored under

the Basic ROM. This means that normal Basic memory is still available for developing your own programs.

Getting It In

The program is presented in the form of a Basic loader which simply has to be typed in, saved and then run. Apart from the *Your Commodore* checksum, the program contains its own data check which will indicate any line in which an error has occurred. If you find any errors, correct them and then save the program again.

So that you don't have to use the Basic loader every time you want to use the UFK option, you may use a small save routine within the program itself. SYS52803, "ULTRA",1,1 for cassette (,8,1 for disk) will do this for you. To reload the normal LOAD "ULTRA",1,1 (or ,8,1) command followed by NEW after loading has been completed.

Using the Program

To initialise UFK, type SYS49152 and press RETURN. The screen will change colour, clear and then ask if you want to clear the data in the function key and description areas. At this time the memory just contains garbage so the correct response is 'Y'. The original screen display will return and a message indicates that UFK is now operative. Every time UFK is called, it stores the current screen display

under the Kernal ROM and copies it back again when you exit from UFK.

Once in UFK you can start to program the keys. Pressing f8 will call up the Editor. Select the key which you want to program (f1-f7) or later you can press f8 again if you want to view any descriptions which you have already defined.

For now, press f1 and the screen will clear except for a reverse field full stop beneath the cursor at the top, left-hand corner of the screen. This full stop is the end marker which is always used to indicate the end of a definition. Even when there is nothing defined for a particular key, this symbol should be present.

Start at the current cursor position, you can now start to type in your new definition but remember that the last two spaces on the screen cannot be used. One space will be needed for the end of definition marker (the reverse full-stop) and one space to prevent the screen from scrolling up and losing the data on the top line or two. This is a necessary compromise to avoid having to use a sophisticated (and much longer) screen editor program.

Now you can try a simple demonstration of the Editor's capabilities. With the cursor in its home position, type PRINT "A TEST" and press the RETURN key. In normal use you would expect this to result in the system printing

Table 1

Reversed Character	Function within definition	Called by pressing
?	Input request	f1
.	End marker	f2
£	Await key press	f3
D	Delete character	f4
S	Home cursor	f5
#	Clear screen	f6
<	Return	RETURN
←	Shifted return	SHIFT/ RETURN

A TEST onto the screen. In Editor mode this doesn't happen, the cursor simply prints a reversed 'less than' symbol as though it were just another character. Now type PRINT 4*5 and press RETURN again. This should appear on the same line as the last command.

This is as far as the current definition will go but, as you can see, a lot more information can be stored on the screen, even more than can be stored on a normal C64 screen.

To end this definition a full stop must be placed after the last return symbol. Press f2 and you'll see this happen and then press f8 to quit the editor. The old screen will be restored and everything looks normal until you press the f1 key. When you do, the words PRINT "A TEST" appear and, instead of the symbol appearing, the return is executed and the words A TEST appear as if you'd pressed return yourself and the READY prompt underneath them. Before the flashing cursor appears, the formula PRINT 4*5 then appears, under this the result 20 followed by the normal READY prompt.

The only time you don't have to end a definition with the reversed full stop is when the definition fills all 998 characters on the screen. In this case leaving the Editor with the f8 key will automatically place the symbol at the end of the definition.

There are several other embedded commands and how they can be used within a definition are summarised in Table 1. All of them are reverse field characters so from now on they will be referred to without reference to their reversed out nature.

Inside the Editor, the CLR and HOME keys work as normal and will clear a written screen of an unwanted function key definition or return the cursor to the top, left-hand corner of the screen. Within a definition you may want to clear the screen or home the cursor for a special purpose so, to facilitate this, there is a special character for each purpose. The 'S' or home command is obtained by pressing f5 and the heart symbol is held on f6.

Before these commands are executed, you'll probably want to halt the function key output so the '?' and '£' have been utilised to allow user input or await a key press.

The question mark is a very powerful feature which allows the user to INPUT fresh data. This allows the user to type in up to 37 characters in length. When the definition printout reaches this symbol, the computer pauses and awaits your input. One use for this is to enter a text output such as the word LOAD" followed by the question mark, another set of quotation marks and the return symbol. In operation, the program will wait for an input after printing LOAD", it will wait for a filename to be typed in from the keyboard until you press return. The end quotes will then appear and the LOAD command executed. The quotes could also be followed by ',8' for a disk command or ',1,1' for a machine code tape load. If you do load a machine code program make sure that it doesn't use the same memory area as the Editor!

Once an input string has been defined it is stored for use the next

time. When the definition pauses for input this last input can be repeated by holding down the shift key and pressing RETURN. If you don't want to input anything at any time, use the delete key to erase to the beginning of the input line and press RETURN. If this means that a syntax error will occur, an error message will appear on the screen but the execution of the f-key definition will continue.

Sometimes syntax errors will occur within a definition due to programming errors. If this happens at any time the function key printout can be halted by pressing RUN/STOP. The computer responds by printing '*** ABORTED ***' and halting execution.

The '£' symbol means that the computer will wait for any key to be pressed before continuing. So if a command such as PRINT "A TEST" has the '£' symbol before the return, the command will not be executed until a key is pressed. The border also flashes as a visual indication that a key press is required.

If the symbol follows a return symbol a space must separate the two commands. This means that a space will be printed which may not be desirable. It is easily remedied by placing a delete symbol, 'D' after the '£'.

Some definitions may not fill a line and may not be direct computer commands. For example, you may want to include game instructions on the f1 key. Normally the text would have to be padded out with spaces to make it fit the screen. This is wasteful of memory so I have included a shifted RETURN symbol. When this is used it operates as it would in normal operation mode, everything on the line is ignored by the operating system and no syntax error occurs.

One extra use for the UFK program is to use it as a pre-loader for a program of your own. Text screens and commands can be stored on the keys and the procedure would be to use the f2 key to load the program, the f1 key to run it and all of the remaining five keys can hold the instructions. At the end of the game or utility, the function keys can be used by the next user to re-read the instructions and run the program again.

The key definition information store is used like a REM statement in Basic. The function of each key can be encapsulated in 117 characters so that you can easily check to see what the key is programmed to do. If you then don't use the particular set of definitions for some time after you created them, then you can easily recheck to see what was their original purpose.

The definitions can be viewed by pressing f8 to enter the Editor and pressing it again. You now have another choice to make - press any other function key to read its description or press f8 again to view all of the definitions in rotation. Whenever you view a description you are asked if you want to edit it. If you press 'N' the next description will be revealed or you will return to the Editor if you

press 'Y', editing may proceed in the same way as editing the data stored on the function keys. The only difference is that the RVS ON and OFF symbols are functional.

After entering the new definition, you can press RETURN to return to direct mode or move on to the next definition.

Table 2 outlines some of the SYS calls which may be used in preparing definitions. For example, SYS49161 could be used as part of a definition where there is a danger of an illegal entry being executed.

Imagine that a definition has a calculation where an attempt may be made to divide a number by zero. This is an illegal function so inclusion of a line similar to IF C=0 THEN PRINT "DIVISION BY ZERO ERROR": SYS 49161. The next line of such a program would be PRINT C/100. If an error occurs the function will abort before this division is reached.

The UFK Demo program demonstrates key definitions and descriptions which will help you to practice using the UFK Editor. VC

Table 2

SYS Command	Function
SYS49152.....	Initilise UFK
SYS49155.....	Call the Editor
SYS49161.....	Abandon data Output
SYS49164.....	Wait for key press
SYS49167,"filename",(device number),1.....	Save key definitions
SYS49170,"filename",(device number),1.....	Load key definitions

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HYBERBLOB

In the intelligence stakes, blobs rate somewhere between Leeds United supporters and games reviewers, i.e. almost zero. But nevertheless, they are entitled to their summer holidays just like anyone else. It is just your unlucky lot in life that it is up to you to look after them.

After carefully scanning the glossy brochures, you decide that Cubos is the place to take them – 100 screens paved with squares. When you arrive there though, you find to your dismay that the brochures must have been written by the same people who advertise Spanish hotels. Nothing is quite finished.

As already mentioned, blobs enjoy the simple pleasures of life. All they want to do is bounce gently from the left hand side of the screen to the right. All you have to do is to make sure that there are no holes for them to bounce down and no obstacles blocking their paths. This is done by picking up and repositioning the paving blocks. Up to four can be carried at any given time and all that remains is to rebuild the place within the given time limit.

This is an original game that requires quick thought and quick action. The screens get progressively harder but they all look the same so that this is only really going to appeal to puzzle fans.

G.R.H.



Touchlines:

Title: Hyberblob. **Supplier:** Firebird, First Floor, 64-67 New Oxford Street, London, WC1A. **Tel:** 01-379 6755. **Machine:** C64. **Price:** £2.99.

Originality: 8/10. **Graphics:** 5/10. **Playability:** 7/10. **Value:** 8/10.

THUNDERFORCE



Oh dear! It's yet another horizontally scrolling, beat the living daylight out of anything that moves, type of game. And from Hewson too who have a reputation for originality. Admittedly it's only a budget price but even so, there must still be a streak of originality left somewhere mustn't there?

For anyone still reading the review, the scenario goes something like this. You and your partner have discovered some secret information about some underground chemical factories. Your discovery was not without peril though and you were captured by the bandits who were running this illegal concern.

Imprisoned at the bottom of a very deep dungeon, you have managed to escape from your cell (how isn't made clear) and you're now trying to escape by running the gauntlet past some guards, both human and alien as well as some deadly sledges. To start with, you are armed only with your fists and your guards, being of a sporting nature, decide not to shoot you but thump you back. As you progress through the levels, you get the chance to pick up various weapons which have been carelessly left lying around - a gun, shield, stone, ball and boomerang. Your escape naturally has to be made within a given time limit but again, you have no idea why.

Graphically, the game is OK but as far as gameplay goes, the only unusual feature is that two of you can play together. Come on Hewson, you can do better than this. **G.R.H.**



Touchline:

Title: Thunderforce. **Supplier:** Hewson Consultants, 56B Milton Trading Estate, Milton, Abingdon, Oxon OX14 4RX. **Machine:** C64. **Price:** £2.99.

Originality: 1/10. **Graphics:** 7/10. **Playability:** 5/10. **Value:** 3/10.

Machine: C64. **Price:** £1.99.

Originality: 5/10. **Graphics:** 6/10. **Playability:** 8/10. **Value:** 8/10.

TALLADEGA

Stock car racing is the name of the game in this game endorsed by Richard Petty, one of America's leading exponents of the art.

Choosing from either the standard oval track or a randomly constructed one, your first task is to qualify for the race itself. Controls are a fairly standard left, right, accelerate and brake and there is also a turbo boost which can only be used when you are at full speed although using it is somewhat heavy on the petrol supplies.

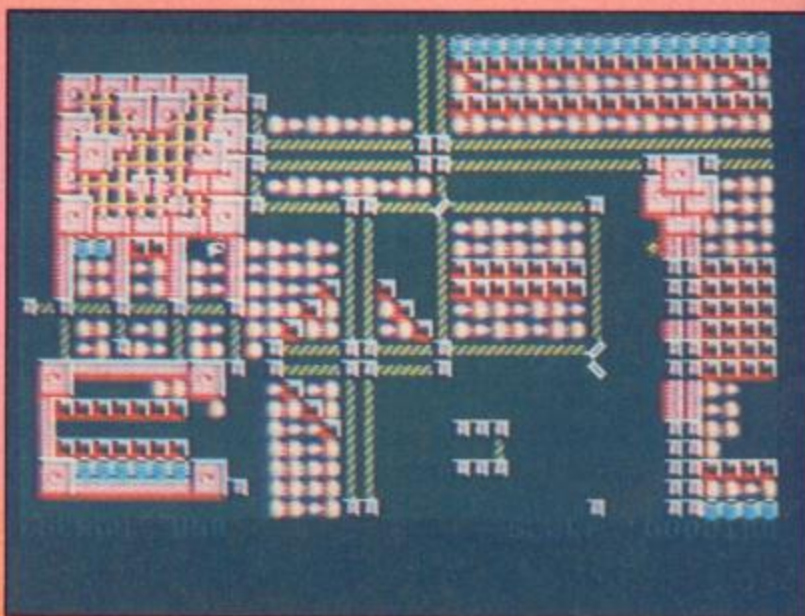
What is unusual for a racing game is that one crash and that's it, you're out of the race. An excellent way to stop you putting your foot down and bouncing off your rivals; a feature of certain other racing games. You are allowed to nudge your rivals tactically out of the way however. Other factors that you have to keep your eye open for are engine failure, duff tyres and low fuel. Any of these requires a visit into the pits. You don't have to do anything special here apart from indicate what you want repaired and watch the clock tick by.

Despite some jerky scrolling, Talladega proved to be highly playable and at under two pounds, is not going to break the bank. **G.R.H.**

Touchline:

Title: Talladega. **Supplier:** Top Ten, MIL, 12 Chiltern Enterprise Centre, Station Road, Theale, Berks RG7 4AA.

SPORE



After an accident in a biochemical laboratory, you are the person selected to retrieve the antidote. Genetically altered spores are running riot and, as luck would have it, the only supplies of the antidote are hidden deep within base.

Spore is a Gauntlet clone in so much as it is a top down view of each sector with generators churning out spores as fast as they can. There are a number of bottles in each sector which must be collected before progressing. Other items include extra energy supplies and temporary invulnerability potions.

The spores and generators are contained by a series of electrical barriers which, although impenetrable, can be switched off. The barriers can also be shifted by shooting at some two way mirrors. This is all well and good but in practice, after the first few tentative games, you tend to ignore all this and just wade in guns blazing.

Spore is a highly enjoyable budget game, ideal for a quick half-an-hour thrash and should you manage to save

the universe, there is always a screen disaster for you to play about with, so it won't be quite so easy the next time.

G.R.H.

Touchline:

Title: *Spore*. **Supplier:** Mastetronic (Bulldog label) 8-10 Paul Street, London, EC2A 4JH. **Tel:** 01-377 6880. **Machine:** C64. **Price:** £1.99.

Originality: 7/10. **Graphics:** 6/10. **Playability:** 9/10. **Value:** 8/10.

The game does look rather dated now with some very blocky graphics. The C64, unlike the Spectrum, does not really lend itself to games of this type and even at budget price, you may want to try before you buy.

G.R.H.

Touchline:

Title: *Blackwyche*. **Supplier:** Mastertronic (Ricochet label) 8-10 Paul Street, London EC2A 4JH. **Tel:** 01-377 6880. **Machine:** C64. **Price:** £1.99.

Originality: 6/10. **Graphics:** 5/10. **Playability:** 6/10. **Value:** 6/10.

BLACKWYCHE

Do you remember arcade adventures? They were all the rage a couple of years ago but seem to have died a death recently, to be replaced by Gauntlet clones and beat-em-ups. One of the top producers then were Ultimate and their games have seen a new lease of life by being re-released by Mastertronic at a budget price.

Blackwyche is a series of games featuring Sir Arthur Pendragon. Our hero has just discovered a ghostly ship and finds himself inexorably drawn towards it. Boarding the *Blackwyche*, Sir Arthur finds himself in the Captain's cabin. The logbook shows that Captain Cavendish and his crew had discovered the legendary Crystal Skull of Souls. The power of the Skull had proved too much for them though and in one last desperate message in the logbook, Captain Cavendish pleads for someone to come and release his soul which is hidden somewhere on the ship.



Sir Arthur must explore the ship, depicted in a raised 3D perspective, finding various items and then working out what to do with them. First priority has got to be finding the sword as without it, life is going to be very short indeed. Patrolling the ship are a series of ghosts, skeletons and flying octopusses. Contact with any of these creatures drains some more of your precious life blood. Some creatures, those that materialise and fly towards you can be killed but others, usually those protecting something important prove to be immortal and have to be dodged.

BOBSLEIGH

If you think that bob is just a name for somebody called Robert or that the Cresta Run is a drink, then perhaps you're not quite ready for the bone crushing, skull smashing winter sport of Bobsleigh. Will you be ready to lead the British challenge at the Olympics in Calgary? Probably not, but you'll have fun trying!

Your first problem once the game has loaded is to get a bob but since your sponsors have only coughed up £12,000 in cash you are forced to pick the cheapest, which unfortunately, is also the slowest. You also have a team who are desperately unfit and must train hard if they're going to stand a chance.

Training the team costs £600 and means a few seconds of frantic joystick waggling which will improve your team if you waggle quickly enough. As your fitness improves so does your strength to push the bob to start your run. This involves more joystick waggling but the maximum speed you can reach depends on your fitness. So if your computer fitness is poor no amount of waggling will improve your speed.

Once you've pushed off the race enters the second phase as you guide your bob down the course, riding the banks to gain speed and avoiding the walls that will slow you down and damage the bob. If you survive the trip down the 3D track you'll get a time and maybe even some championship points.

Bobsleigh isn't just about training and racing as you also have to survive and improve your chances by managing your



sponsorship cash. If you spend money on training you may win more races and get more sponsorship but if you crash or hit the sides of the run and damage the bob the repair bills could bankrupt you and end your quest for gold. T.H.

Touchline:

Title: Bobsleigh. **Supplier:** Digital Intergration, Watchmoor Trade Centre, Watchmoor Rd., Camberley, Surrey, GU15 3AJ. **Tel:** 0276 684044. **Machine:** C64. **Price:** £9.95.

Originality: 7/10. **Playability:** 7/10. **Graphics:** 6/10. **Value:** 7/10.

BASIL THE GREAT MOUSE DETECTIVE



The scene is 221B Baker Street. In the basement stirs Basil the greatest mouse detective in all of Mousedom. Unfortunately, his latest case has led to the kidnapping of his friend Dr Dawson who is now in the evil clutches of Professor Ratigan.

To rescue your chubby friend (and incidentally solve the case) you must track down the evil Professor by collecting clues that will lead from the shops and docks of London through London's sewers and into Ratigan's den.

These clues are found in neatly packed cylindrical containers that are spread throughout the ladders and ramps of the games screens. However, the fiendish Ratigan has sneaked in eight extra containers complete with false clues. Therefore, whenever you have collected five clues you must press the ? key which will tell how many correct clues you have! If you haven't got five it's up to you to find out which ones are the red herrings.

In addition to the clues you can also find cheese to top up your energy which is lost by contact with Ratigan's minions and mousetraps that can be dropped to trap these nasties.

T.H.

Touchline:

Title: Basil The Great Mouse Detective. **Supplier:** Gremlin Graphics, Alpha House, 10 Carver Street, Sheffield S1 4FS. **Tel:** 0742 753423. **Machine:** C64. **Price:** £9.99.

Originality: 6/10. **Playability:** 8/10. **Graphics:** 6/10. **Value:** 8/10.

RADIUS

The Radius is the most important hyperspace transport route this side of the Sanvolgrani Rift and it's been taken over by aliens. Now you, the bravest, fastest and toughest pilot in the Universe must get it back by taking on the aliens in your Ripley Class Hunter Killer Fighter.

The Radius looks like any other backdrop for this type of standard shoot'em up with aliens attacking in a series of unrealistic attack waves from those that come at you in an easy to blast straight line formation to a guaranteed life losing reverse assault.

The result of all this is an unimaginative but annoyingly difficult game to play but, all is not lost, as the game also contains a painter game that you can play while loading and a sub game that's better than the main game. T.H.

Touchline:

Title: Radius. **Supplier:** Players, Mercury House, Calleva Park, Aldermaston, Berks RG7 4QW. **Machine:** C64. **Price:** £1.99.

Originality: 4/10. **Playability:** 6/10. **Graphics:** 5/10. **Value:** 4/10.

ZIG ZAG

Zig Zag is a 3D, four way, diagonal, scrolling game in which you play a trainee star pilot who must face the ultimate test, the Matrix of Zog! The maze was created to find the ultimate star pilot and although countless hopefuls have tried, none have succeeded in collecting the Eight Crystals of Zog. Now it's your turn.

The maze consists of 1,400 3D screens through which your ship must fly and fight off the constant onslaught from the attacking maze aliens. Your ship flies along just above the floor of the maze and can only turn around corners by colliding with pyramids that then deflect the ship in a new direction. If you hit a wall you just bounce straight back.

To get around the maze you will have to trigger a series of switches by flying over them or shooting them with your laser that adds new prisms so you can turn around new corners.

You can improve your chances further by gathering credits for every alien you blast. These can then be cashed in at the shop for useful objects such as missiles, shields, infra-red vision, maps of the maze and smart bombs. Pick the right objects and use them well and you may live long enough to reach a save zone that allows you to restart a game from part of the way through the game, infra-red zones that remain blacked out until you buy an infra-red system for your ship and timelocks that must be passed before they close and seal you in forever.

The result is a game that requires a combination of shoot'em up, mapping and arcade adventure skills. Finally, a hint. If you're going to map the game start in the bottom right hand corner and get a BIG piece of paper! T.H.

Touchline:

Title: Zig Zag. **Supplier:** Mirrorsoft, Athene House, 66-73 Shoe Lane, London EC4P 4AB. **Tel:** 01-377 4645. **Machine:** C64. **Price:** £9.95 (Ca) £12.95 (Disk).

Originality: 7/10. **Playability:** 7/10. **Graphics:** 7/10. **Value:** 8/10.



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Relative File Programming

Learn the correct method of using relative files by following our series. We kick off with relative versus sequential files

By Eric Ramsay

There is a lot of mystique surrounding relative filing on the Commodore range of computers which is quite unjustified. Once a programmer has built up a library of routines, relative filing is only slightly more difficult than the sequential storage method but it is far more powerful, much more flexible and quicker in data retrieval.

As a challenge I began relative file programming on the Commodore 64 and have several programs which run very efficiently. Of course, with the new BASIC 7 of the Commodore 128, relative file programming is much easier.

In this series of articles, I hope to show you that when storing large amounts of information you should think automatically of relative files rather than the sequential method. I shall include every routine necessary to set-up, read, write sort, search and

even delete from relative files of your own.

Let us look at the two ways of storing the data and compare them.

Sequential Files

If you have used BASIC at all on your Commodore you will probably be familiar with sequential files. In fact, a LIST is a Sequential File of a BASIC program, stored on a disk or a tape cassette. If you have only a datassette, the only means of databasing available to you is a sequential file, but hang on to these articles: you will surely have a disk-drive before long!

Storing the program data from a database is one of the most important questions to consider at the outset; but the question is, which to use? Let us look at the sequential file. Normally, used either on tape or disk drive, this

type of file stores the information, FIELD by FIELD, one after another continuously until the end of the File. Normally, the information necessary to collect the data back from the File is given first, i.e.

Name of FILE

Number of FIELDS

Number of RECORDS

These variables are followed by the file data, one after another. The program would read the essential information, number of RECORDS and Number of FIELDS, and then use a nested LOOP to read the data back into string arrays inside the computer memory. This method is a simple but effective method of storing the information contained in a database.

Then why not use it? For a small DATABASE of course, this method is quite satisfactory. However, the main disadvantage is its simplicity; the data is stored sequentially on the medium

(either tape or disk) and therefore must be read from beginning to end.

It is not possible to go immediately to RECORD number 1170, for instance: you must read through all the data until number 1170 is reached and then use it. Suppose there are 7000 RECORDS? The time taken to access a particular RECORD would be enormous, particularly if using tape. If you have just the datassette then you are stuck with this method.

In order to avoid constantly reading through the data, most sequential files read all the data into the RAM of the computer once, at the beginning of the program, and then write the updated data back into storage right at the end of the program. This is still effective and simple, so what are the problems?

The limitations of sequential files can be broken down into the following:

File size – since all of the data has to be read into memory to reside in the computer while the program is running, then the size of the file is limited to the RAM in the computer, which is expensive of memory and can affect the processing speed and 'Garbage Collection' considerably.

Efficiency – all of the RECORDS are contained on the storage medium in one lump, as it were, and cannot be accessed (looked at) one at a time. This means that the RECORD DATA must be kept in RAM.

Fragility – while the program is running, all the new RECORDS and the updates are in RAM only. A single power-cut, even for a second would be enough to lose all the new data. The system is 'fragile' and such an event or a computer 'crash' because of inefficient error-trapping would lose what could be hours of work.

Storage – since all the data is written onto the medium in one operation, the storage is fragile; if there is a problem with the Data write, the operation will continue regardless, but the next time the program is RUN the File Data will not load properly. Result – a system crash and all the previous work is useless because the Data is unobtainable.

So, despite the ease and simplicity of sequential file programming, we shall consider instead the merits of the relative file type.

Relative Files

Is relative file programming really worth all the extra effort of

programming? The advantages over the Sequential File can be summarised as follows:

File Size – the relative file RECORDS are written individually on the disk, so the relative file size is not dependant on the computer memory but the limitation of the relative file size permitted on the 1541 or 1570/1 disk-drive. In all cases, strangely, this limitation is 167132 bytes (even on the 1571 double-sided drive).

Efficiency – because each RECORD is placed in its unique position, each can be accessed with one operation controlled by the program. It is no longer necessary to read through the whole file at the beginning of the Program RUN.

Fragility – because the RECORDS are written individually on the disk storage medium a system crash or power failure does not mean the loss of any data except the very last RECORD write-operation.

Storage – since the RECORDS are written as they are entered, any problems effecting the write operation would be signalled at once and would only effect that single RECORD.

There is an advantage – massive file sizes are available, each RECORD can be accessed immediately, the system is much less vulnerable to crashes through error or power-failure. There is a price to pay, of course. The maximum relative RECORD size permitted is 254 bytes (characters, including spaces and separators, more of that later).

So the relative file has advantages over the sequential, but has to be programmed more carefully to take full advantage of the facilities. We'll now look at the relative file programming theory.

I have assumed that you already understand the usual statements: PRINT, INPUT, GET, OPEN, CLOSE, and the new BASIC 7 DOPEN and DCLOSE. You should also have a working knowledge of strings, arrays and variables. If not, perhaps you would be as well to study a short course of BASIC programming first.

Once you have worked through this series you will have a library of BASIC routines to enable you to program a relative file for any purpose, either a full-blown database or a simple relative file. Whichever is required, the methods and program routines needed remain the same.

Let us take a quick look at the theory of relative filing. Instead of the

data being stored in a huge lump on the disk surface ready for reading into memory, the data is written into suitable RECORDs separately onto the medium. The later versions of BASIC have DOS commands which calculate the correct positioning of the read/write operations automatically. Don't despair 64 owners, I shall cover your machine as well.

Here is a simple example. Suppose we need to write a relative file for a disk file. The one I use for my disks has over a thousand program names stored on it! For disk filer, which after all is a sort of database, all we need to do is to calculate the length of the RECORD as it is placed on the disk. What information do we need on each RECORD?

Well, we need the number of blocks, the name of the file on the disk, the type of file and the name of the Disk. So the RECORD would look like this:

File Size	File Name	File Type	Disk-name
3 chars	18 chars	3 chars	8 chars

The database therefore has four fields and a total length of 32 characters. Since each character occupies one byte of disk space, the RECORD length is 32 bytes. Easy, so far, isn't it?

There must be one more character on the RECORD than is actually used, so the RECORD length must be shown as 33 bytes.

Now we have to look at the question of separators. Quite simply, there are two ways we can write and read a RECORD in a relative file. We can write the RECORD in one go using a single string, which is the fastest method, or we may separate the FIELDS with a carriage return, a CHR\$(13). Why would we do that?

Let's look at the above example again. The total length of the RECORD is 33 bytes. This can be read in one single operation without any buffer problems. (Remember a single string of 88 characters can be read by the Commodore 64, or 160 for the 128.)

A string can be added together to a total length of 256 characters, but such a string could not be INPUTted in one read because of the buffer limitation. In our case, the length of the RECORD enables us to read the entire record in one operation. I shall be looking at the question of separators in the next article of the series.

The other use of separators is to stop the read of a FIELD within a RECORD. This is really only useful if the length of each FIELD is varied throughout the file. In our case we are going to ensure that each FIELD is exactly the same length, so separators are not required.

Now we know the length of the RECORD we can determine the permitted number of RECORDs in each file. This limitation is imposed by the DOS, and is a total file length of 167,132 bytes. So the permitted maximum number of RECORDs is $167132/33 = 5,064$. Since we will be using the routine for different purposes then we shall declare that as a variable, i.e. `AVAIL=INT(167132/33)`.

We are allowed a total of over 5000 RECORDs in the file. Now we can examine ways in which we would OPEN the relative file. In BASIC 7 this could not be easier. If we declare a variable 'LREC' as the length of the RECORD then we open a File with the simple command:

```
dopen # 5,"flier",1(lrec),d0,u8
```

What? Was that it? Yes. But let us look at the RECORD length again. We also need the FIELD pointers, i.e. the place within the RECORD where each FIELD begins. We will need these so that we can display the RECORD and print it out. It would be a bore to work those out, so we could use a FIELD pointer routine to do this for us:

```
3520 rem **** calculate field pointers
3530 lrec=1: REM ** declare length as 1
3540 for a = 0 to c: REM ** C is number of FIELDS
3550 lrec = lrec+field(a):REM** add field length to LREC
3560 fpoi(a+1)=lrec: REM ** declare field pointer
3570 next a: REM ** end loop
3580 fpoi(0)=1:REM ** 1st FIELD pointer is always 1
3590 return
```

This routine works for any number of fields in a record. It will work out the total length of the RECORD and the FIELD pointers for each provided that the length of each field is stored in the array FIELD() beforehand. For creating a database, the FIELDS may be any length and any number within a RECORD. If the length of the RECORD is greater than 160, however, an additional routine must be included to allow for the use of a single separator, so that the RECORD may be read back.

```
3584 iflrec < 159 then 3590
3586 lrec=lrec+1:rem *** allow for separator
3590 return
```

Owners of C64 may need even more lines, depending on what sort of write routine you intend to use. More about that later. Instead of the lines shown above, you will need the following:

```
3584 iflrec < 88 then 3590
3586 lrec=lrec+1:rem *** allow for separator
3588 if lrec < 176 then 3590
3589 lrec=lrec+1:rem *** allow for 2nd separator
3590 return
```

I would suggest a loop to INPUT the names and lengths of the FIELDS like this:

```
100 input "Number of Fields Required?";c
110 c=c-1: rem **** the Loop starts at 0 so c=c-1
120 for a=0 to c
130 print "Name of field";a+1
140 input field$(a)
150 print "Length of Field";a+1
160 input field(a)
170 next a
180 if lrec > 254 then go to edit routine:rem ** check for maximum RECORD size.
180 gosub 2410:rem ** now set up the File
```

You may consider standardising the lengths of the FIELD names to, say, ten characters to make it easier to display them on the screen later, like this:

```
165 field$(a)=left$(field$(a)+",",10)
```

However, if the RECORD length LREC is greater than 254 bytes, since no RECORD can be longer than that, then the FIELDS will have to be edited until the RECORD as a whole contains less than 254 bytes. It is simple to GOSUB to another routine which displays the FIELDS and requests which one to edit.

Opening a Relative File - BASIC 2

No, C64 owners, I haven't forgotten you: you need the BASIC 2 version of opening a relative file. Your DOS does not take on much of the work for you, but provided you follow the general layout of these lines you shall be able to adapt them for your own programs. You would OPEN the relative file with:

```
OPEN 5,8,5,"FILER,L"+CHR$(LREC)
```

Once the relative file has been opened, it can be used for both reading and writing RECORDs, another advantage over the sequential file, which can only do one or another and not both.

You would have to open the error channel first in order to read for Disk errors:

```
OPEN 15,8,15
```

Dealing With Errors

Now we have started using the DOS commands, we will need to check the error channel of the drive every time we access the relative file. You would think that this would slow the program down, but surprisingly it seems to be the reverse. Because the error channel is constantly checked at every read/write operation you will find that the program runs much more smoothly and without errors. This is especially important because in relative files the DOS is working that much harder.

With BASIC levels higher than the measly 2 of the C64, you might have a DS assignment. The Plus 4 and certainly the 128 have, and we'll look at this first.

The DS and DS\$ Command is the built-in disk error command which can be used in direct or program mode. Simply typing ?DS\$ and pressing the RETURN key will read the Disk Channel and give a result, normally: 00,ok,00,00

If there was an error, the DS command will clear it and turn off the error light which would have been flashing on the drive.

It is the first number '00' which we are primarily concerned with. This first number is the error number, which we can use to take appropriate action.

The first thing to detect is, of course, that there is no error, and then to return to the main routine as soon as possible. Error numbers less than 20 are not true errors and may be ignored: the error number 01 for instance is an indication that files have been scratched.

So we will ignore errors less than 20 with the very first line of this Error-Check sub-routine:

```
3600 rem **** disk error check routine
3610 if ds < 20 then return
```

If we are writing to a RECORD which has not yet been set up, the DOS will actually create it for us without

intervention, so we shall ignore the error number 50: 'Record not Present'.

```
3630 if ds = 50 then return
```

Of course, while writing for yourself, you may wish to check other errors, such as the error 71, directory error which can be corrected with a collect or validate command. (Yes, contrary to common belief, you may use collect or validate with relative files. Since the DOS of the drive sets up the relative file and does its own housekeeping, there is no danger of the validate or collect command erasing the file. The warning about validate or collect applies to random access files, which is totally different.)

```
3620 if ds = 71 then collect: return
```

You may also like to display any real error on the screen and then returning to the Menu, such as:

```
3640 print ds$:dclose:getkeyzz$:goto
80:rem ***** return to menu or
STOP, whichever you prefer.
```

All we need to remember now is to GOSUB to this sub-routine after every read and write operation.

Disk Error Checking - BASIC 2

The poor old BASIC 2 of the C64 can do the same, but in a much more long-winded fashion. The C64 uses the same error-numbers but there is no DS\$ command. We also have to ensure that we have opened the Error Channel 15 first. Most people prefer to use the same file and channel numbers, hence the 'OPEN 15,8,15' above. Since we have neither the DS\$ or the DS command, we have to INPUT the error channel number from the File no 15 on the channel 15 already opened. We do this with the first line of the sub-routine:

```
3600 rem **** disk error check routine
3610 input # 15,er,er$
and then we can continue with the
remaining checks
3615 if er < 20 then return
3630 if er = 50 then return
3620 if er = 71 then print # 15,"V0":
return
```

Now we can add the error check sub-routine to the open file routine of the program:

```
OPEN 5,8,5,"FILER,L,"+CHR$(LREC):
GOSUB 3610
```

and for the 128,

```
DOPEN 5,"FILER",L(LREC):
GOSUB 3610
```

Now we have the relative file opened and the error-checked, now we have to create the RECORDs to write to.

Setting Up - BASIC 3.5 +

The DOS will write to each RECORD whether it has been created or not, because we have 'written-out' the DOS error, RECORD NOT PRESENT. However, this is not the most efficient way of doing it. If we ask the DOS to write to the highest number of RECORDs which we might need, the DOS will create that RECORD first, and then go on to create the RECORDs below it down to RECORD 1. But we have to tell it to do this.

With BASIC 7 it is easy; DOS works out the correct pointers for each RECORD: all we need is to tell it the RECORD number of the LAST RECORD required and the DOS will then create all the RECORDs up to it. This can take some time because even the 1571 writes only about three RECORDs per second.

For five thousand RECORDs there would be a long delay while these were being created which is very boring. You might consider creating the RECORDs in blocks of fifty, creating the next batch of fifty when the RECORD number reaches the end of the created file.

The statement for all read and write operations is RECORD . The number after the symbol is that of the file previously opened, in our case five. If the record to be accessed is a variable, then the variable must be enclosed in parenthesis. The last number given is the byte number of the start of the read or write, and here this is 1.

Now we can program the create file subroutine.

```
2400 print "Creating File";name$
2410 print "Records Set at";avail
2420 dopen # 5,(name$),1(1rec):gosub
3610
2430 record # 5,(avail):gosub3610
2440 record # 5,(avail):gosub3610
2450 print # 5,chr$(255):gosub3610
2460 dclose:gosub3610: return
```

Notice we make the RECORD statement twice. This is recommended by the 1571 disk-drive manual as a safety measure. The DOPEN file statement has the name of the file, NAME\$, enclosed in parenthesis. Now look at what the poor C64 owner has to do!

File Create Routine - BASIC 2

Now, C64, Owners, we have to sort you out. The same basic principles

apply, but you have to do more programming in order to achieve the same results. We have already looked at the OPEN statement for the file; now we have to write another routine so that the RECORD pointers, (not to be confused with field pointers) can be calculated before a read or write operation is commenced.

We have first to calculate the Hi and Lo bytes of the RECORD before we begin. The RECORD statement is denied to us on the 64 or the 128 in 64 Mode, but we simply program a separate sub-routine to take the place of the RECORD statement.

We write this sub-routine so that it can be referred to from any part of the program. We shall need the routine for every read and write operation. We can slot it near the disk error check sub-routine:

```
4112 rem **** 64 Record Pointer
Routine
4114 hi=int(rp/256):rem**** rp is
desired record number
4116 lo=rp-256*hi: rem** hi and lo
are the high and low bytes of the
RECORD
4118 return
```

Now, during the program, provided that the variable RP contains the desired RECORD to access, a GOSUB to this routine will return the proper pointers to that RECORD within the file. Now we can continue with the file create routine. First we put a message on the screen to explain what is happening:

```
2400 print "Creating File";name$
2410 print "Records Set at";avail
Then we open the error Channel,
2415 open 15,8,15
```

And then we get to the nitty-gritty. Notice that the OPEN statement contains the string NAME\$. Pay particular attention to the odd format of the statement. One missed comma within the quote marks will give you a syntax error.

```
2420 open 5,8,5,"0:" + name$ + ",1,
"+chr$(1rec):gosub3610
```

We use the record pointers routine to find the hi and lo bytes of the RECORD by declaring the variable rn as equal to avail.

```
2425 rp=avail:gosub4114:rem***get
Record pointers
```

And then we position the pointers before we do anything. You notice that we use the Command Channel 15 to position the pointer. The CHR\$(96+5) is a constant used to keep the file compatible with the way BASIC 7 files

work. Always use the number 96, then add the File number (not the command file no 15) to it.

```
2430 print # 15,"p"+chr$(96+5)+chr$(lo)+chr$(hi):gosub3610
```

We repeat the statement for safety. Notice this time I have simply added the file number 5 to 96 to provide the channel number.

```
2440 print # 15,"p"+chr$(101)+chr$(lo)+chr$(hi):gosub3610
```

Then having positioned the pointers to the correct highest RECORD number, we write the special null character to the RECORD. Notice that the PRINT statement uses the file number and not the command channel to write to the RECORD.

```
2450 print # 5,chr$(255):gosub3610
2455 Close5:gosub3610
2460 Close 15:return
```

Here we have closed the file and checked the disk for errors BEFORE closing the command channel 15. It might be easier to simply open the command channel right at the beginning of your program and leave it open throughout, only closing it when all accesses have finished, but here I

close it to make the point.

Although there is no sign of it from the program, the DOS of your disk drive will take over now, and create all the RECORDs in the file ready for future use. For this reason you might consider setting the variable AVAIL to, say fifty RECORDs to begin with, and then creating the RECORDs in batches of fifty, otherwise you may have quite a wait until 4000 RECORDs have been created.

They are all the routines you need to create a relative file ready for use. Remember, you must specify the length of the RECORD LREC. You should have already decided on the length of each of the FIELDS and assigned these lengths to the FIELD array, and declared the number of FIELDS to the variable C.

If you have done that, the FIELD Pointer sub-routine will work out everything else the program needs. String or numeric variables may be used with either BASIC 7 or 2, but those using the C64 MUST be very careful not to omit the commas inside the quote marks.

In order to use a relative file, it is

important to get the routines in the right order. Use them as follows:

Get the name of the File into NAMES. INPUT the FIELD lengths into the Array FIELD(), with C as the number of FIELDS you require.

GOSUB to the field pointer routine. The length of the RECORD will be returned as LREC.

Use the AVAIL variable to calculate the permitted maximum number of RECORDs in the file.

GOSUB to the file creation sub-routine. C64 owners will need to GOSUB to the special RECORD pointers sub-routine for the relevant bytes required. DO NOT forget the Disk-Error check for EVERY disk access.

The file will then be set up ready for use.

In the next part of the series, I will be detailing routines for collecting the different FIELDS into a single STRING for writing and then reading them from the RECORDs. I shall explain the use of the FIELD separators a little more fully later on so that you may decide for yourself how to use them.

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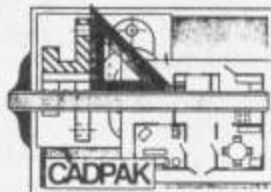
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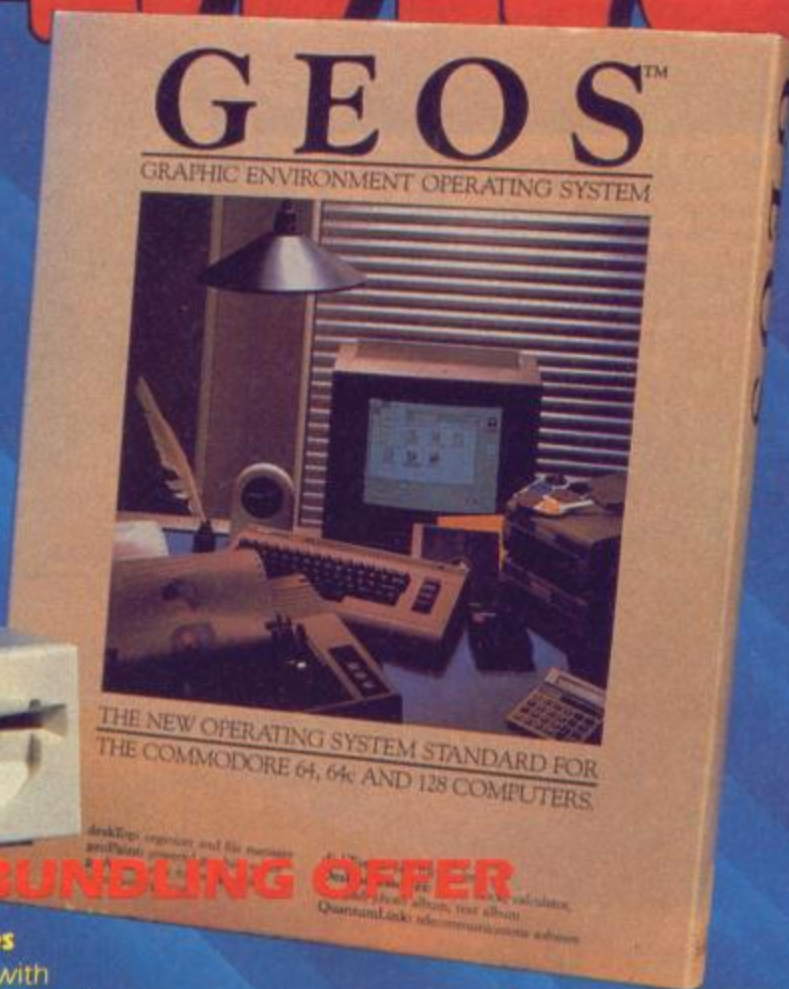
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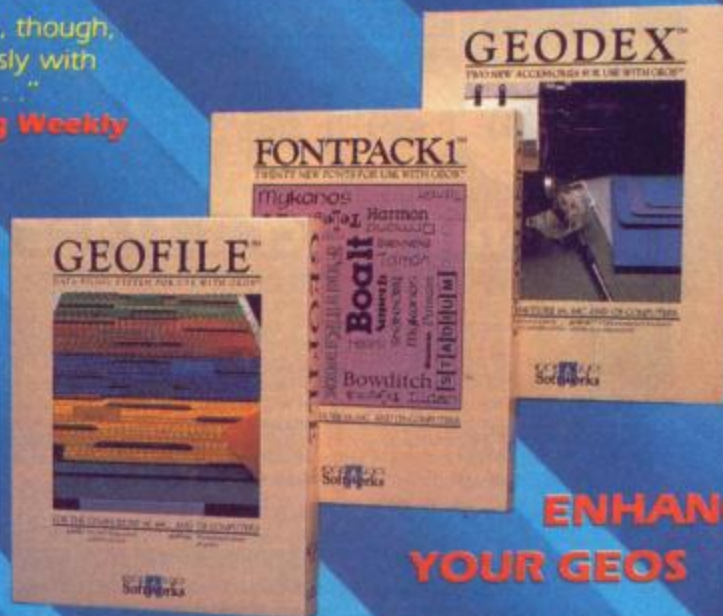
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Input Clean-Up

Using the INPUT command can be a very messy business. Here's one way around the problem.

By Kevin Blight

By Kevin Blight

The only problem with the built-in INPUT command on the Commodore 128 is that the user is allowed to type in any combination of characters available from the keyboard. This can cause problems if, for instance, a comma or even worse, inverted commas are entered. In addition, it is only possible to include text in front of the question mark and cursor. A statement which results in a screen printout such as:

NAME? AGE

It would be useful for a database type of program. Two inputs on one line would result in the word AGE being added to the string entered at the name.

Input Clean-up circumvents these problems and more:

1. Maximum input length is set by the user.
2. The actual input length is stored in a zero page location.
3. Upper/lower case switching is disabled.
4. Commas and inverted commas are ignored.
5. Only alphanumerical characters and

punctuation marks are accepted.

6. A delete function is available (using either cursor left or the DEL key).

7. Cursor right inserts spaces.

8. The user will exit from the routine if cursor up, cursor down or the RETURN key is pressed. In any of these cases, a flag is set to indicate which one it was.

Once installed, the new routine is selected by SYS 4864, m. The value of m represents the maximum length of the input and can have any value from 1 to 80 and any value outside this range will cause the routine to abort automatically.

A special cursor is printed during input (similar to an underline cursor) and, if this reaches the maximum length which was set when the program was SYS called, the routine will hand back to Basic program control.

As stated earlier, exit from the routine can be achieved with cursor up and down or RETURN keys. The method of exit is then recorded in location 250:

0 Cursor down pressed

xxx

0 Either maximum length was reached

or RETURN was pressed.

1. Cursor down pressed.

2. Cursor up pressed.

With the correct routines, these values can be used to indicate if the user wishes to go forward or backwards through a list of entries. The length of the input statement is stored in location 251 in Zero Page.

Apart from the Basic loader and disassembly, there is also an example listing. This takes the input and stores it as A\$, while its length is stored in A%.

With very little work, Input Clean-up could also be made to run on the C64. Only two of the memory locations specific JMP commands within the routine, the rest are conditional branches and \$FFD2 or \$FFE4 are both part of a jump table common to both machines.

Change the Basic loader lines as follows:

140 DATE 49152,49630

180 DATA FF,A9,20,A2,00,9D,CC,C0,0493

280 DATA FB,9D,CB,C0,E4,FA,F0,10,0601

410 DATA FB,4C,2B,C0,54,48,49,53,036A


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Reveal Your Characters

*Sprites don't have to be visible to be effective.
Here is one way to get them to work for you.*

By Simon Clarke

High resolution sprites are usually visible, coloured characters which show up well against the background colour. In other words the colour of the 'on' Pixel differs from the background colours. In some of my commercial games I have found an interesting use for invisible sprites – solid sprites set to the current background colour – to smoothly reveal text onto the display screen.

An unexpanded sprite, Sprite 0, is created as a solid block of colour measuring 8x8 pixels; the size of one character. The colour of this sprite is then set to equal the background colour and is placed on the screen where the first character of the text will be placed.

As the sprite sweeps across the screen pixel by pixel, the first character is revealed. Once the sprite has moved far enough to reveal all of the character, the next character is poked into position and revealed.

This process repeats until all of the characters are displayed giving

the impression that they have been printed pixel column by pixel column. This technique opens up several possibilities for the programmer and a few suggestions follow.

Larger, expanded sprites could reveal larger blocks of text or large user-defined characters by switching on all of the sprite pixels.

Two sprites could reveal text from either end of a line but try to arrange that they overlap at the middle of the text, line over a space or the illusion will be spoiled.

Complex reveal techniques can be developed by using specially shaped sprite. An example of this would be to create the top corner of the sprite in Figure 1.

Each '.' is an off pixel and the 'X' represents a switched on pixel. The effect created is that each pixel row is revealed pixel by pixel. As the second row of the first character is revealed the next character starts to appear.

By poking values to the sprite

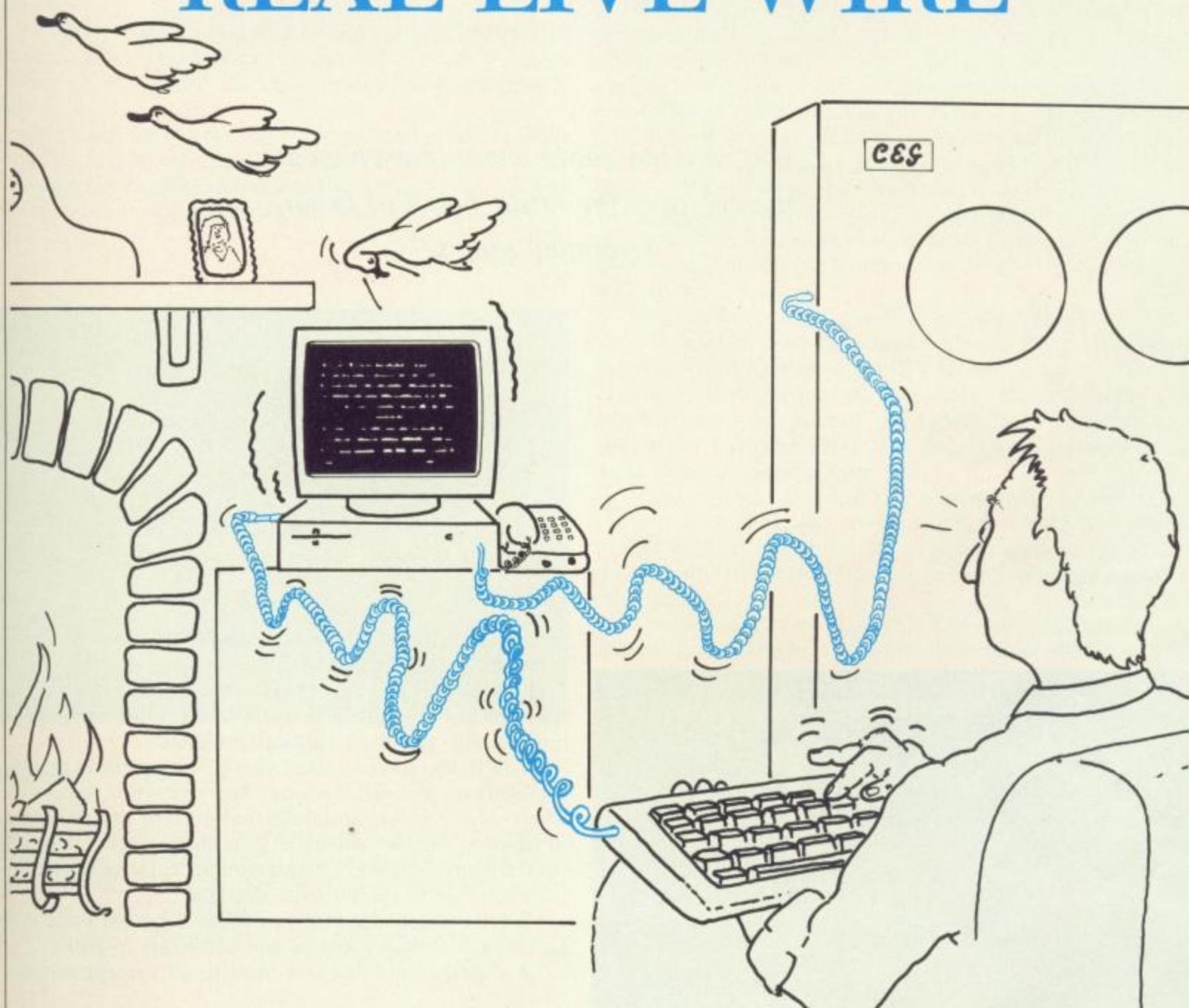
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Figure 1

area according to a predetermined pattern, the astute programmer could make letters fizzle into view in an apparently random hi-res pattern. Beam them up, Scotty!

Think about the process for a while and I'm sure that you could adapt my program to all sorts of purposes. Remember there are no restrictions to this process apart from the number of sprites displayed. Use several sprites or even a high resolution screen and for amazingly colourful and impressive results.

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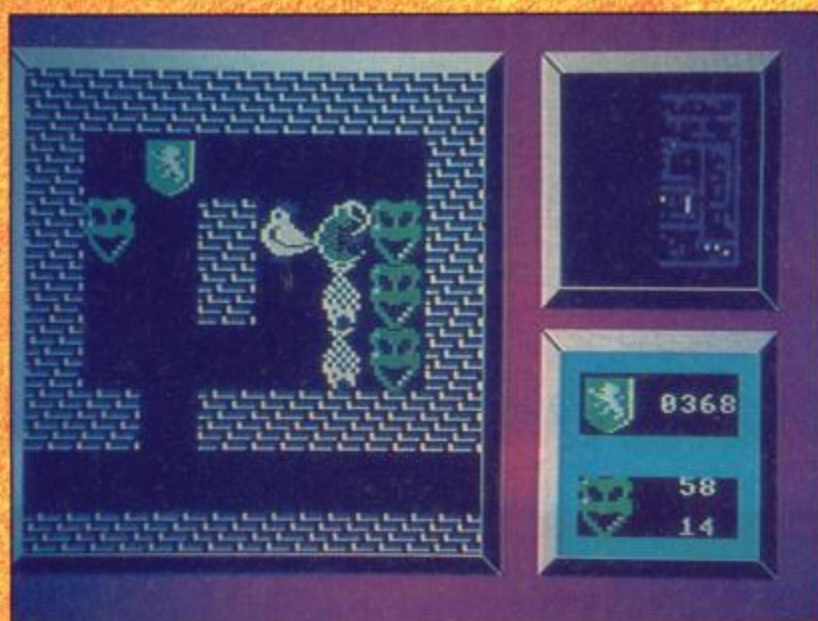
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If you've risen above shoot 'em-ups, cast your eye over the latest batch of brain-straining games

Xor



Xor is a manical maze game that will mangle your mind and you'll love every minute of it!

You must collect masks from fifteen mazes by running one of your two shields over them and the only things that can possibly get in your way are chickens that always move left and fish that always drop down. It couldn't be simpler. Well, it could be a lot easier particularly since one wrong move could cost you the entire game.

It's surprising how easy it is to get trapped with nowhere to go or crushed by a chicken or a plummeting fish.

Avoiding such disasters must be your first priority and finding a map the second. This must be collected and comes

in four segments and it's almost suicidal to enter a quadrant if you haven't got the map. Only by using the map can you find the correct place to detonate the bombs. There are two types of bombs that blow away walls, either vertically or horizontally and these cannot be wasted.

You'll also have to deal with frowning masks that turn the lights on and off; it's tough to move when you can't see where you're going, and dolls that must be shuffled around in between the two shields as you tackle screens that range from the easydots and waves through explosive mixture and the challenge to the ultimate decoder.

Solve the decoder and you could win your place in the Order of Xor with a badge and certificate to prove it.

A superb game that is a must to all strategy gamers.

T.H.

Touchline:

Title: Xor. **Supplier:** Logotron Ltd., Dales Brewery, Gwydir St., Cambridge CB1 2LF. **Tel:** 0223 323656. **Machine:** C64. **Price:** £9.95 (C) £12.95 (Disk). **Originality:** 9/10. **Playability:** 9/10. **Graphics:** 4/10. **Value:** 9/10.

Chuck Yeager's Advanced Flight Trainer

Chuck Yeager, the first man to break the sound barrier, invites you to sit in the test pilot's seat as you push 14 different aircraft to their limits and then survive!

Before you can climb into a Spitfire or a F-15 you'll have to learn how to fly through the flight instructor and learn

(quickly) the importance of not having your landing gear ripped off and why it's not safe to stall a plane. The instructor uses a cursor and messages that are easily followed by joystick movements so that you're soon ready to join those magnificent men in those flying machines when you've perfected aerobatics such as the slow roll, split S and Cuban 8.

As a test pilot you're on your own as you find out exactly what each of the 14 planes can do and the only way to do this is to see what they can't do, then survive the unpredictable outcome.

Most flight simulators leave you cold after you've been for a few flights but Chuck Yeager offers you 14 flight simulators for the price of one and the chance to risk life and limb as you chase the master on the dead man's slalom.

T.H.



Touchline:

Title: Chuck Yeager's Advanced Flight Trainer. **Supplier:** Electronic Arts, Langley Business Centre, 11-49 Station Road, Langley, Berks., SL3 8YN. **Tel:** 0753 49442. **Machine:** C64. **Price:** £9.95 (C) £16.95 (Disk). **Originality:** 6/10. **Playability:** 7/10. **Graphics:** 6/10. **Value:** 8/10.

Ogre

Can you stop the Ogre in his tracks? That's the challenge laid down by Origins in the computer version of the classic board game. The Ogre is a cybernetic supertank that rules the battlefields of the 21st Century. You command a defensive force of infantry, tanks and guns who must defend the unarmed command post and stop the Ogre!

Ogre the game is supplied on disk in a standard (impressive) Origins/Microprose box with a manual, tactics book and command card (printed yellow on grey yuch!!) and an anti-radiation badge which is essential on a battlefield where nuclear shells fall like confetti.

Ogre the cybertank is a massive living machine that actually enjoys crushing infantry under it's tracks or frying

them with it's anti-personnel mines. There are two types of Ogre - Mark III and Mark V. Mark III is formidable with an arsenal of two missiles, a main battery and four secondary batteries that can wreck most defences. Mark V is even worse with six missiles, two main batteries and six secondary guns! All of which can fire every turn.

Before the Ogre begins his relentless journey of destruction the defence can buy it's defence by spending armour and infantry points. With these points it can construct a defence to protect the command post. Lose the command post and you lose the game. The defensive player (the human in a one player game) can build his forces from howitzers, heavy tanks, missile tanks and the versatile GEVs. The GEV's are light hovercraft that have the advantage of being able to move twice in a turn, once before and once after they fire! This means they can strike at a weakened Ogre and then retreat out of range. However, a full strength Mark V will rip them apart.

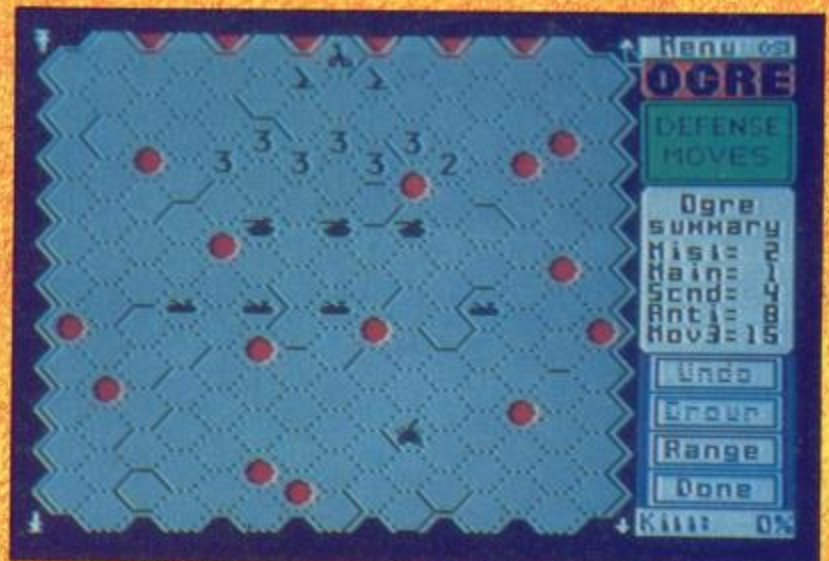
The tactics you will use will vary depending on the Ogre you face and the defences you have chosen, but will probably lie somewhere between the GEV hit run tactics and the hit and hope howitzer battles. Whichever tactics you employ you will have never have played a game like Ogre before, and should relish the challenge of an army trying to stop a single piece in a remarkably close fight.

Pop-up menus and dragging and dropping of objects try and increase the pace of the game but potential Ogres should realise it is still a strategy game and will require considerable use of the little grey cells if you're going to stop the Ogre.

The board game version of Ogre is still available in specialist game shops (and is highly recommended) and was followed by a sequel called GEV and several articles in hobby magazines detailing the Mark VI Ogre as well as aircraft and naval actions in the Ogre world. Perhaps there's a sequel waiting in the wings. If there is I'll be ready, although

I doubt the infantry that were crushed in the last game will be as keen.

T.H.



Touchline:

Title: Ogre. **Supplier:** Origins/Microprose, 2 Market place, Tetbury, Glos., GL8 8DA. **Tel:** 0666 54326. **Machine:** C64. **Price:** £19.95 disk only. **Originality:** 9/10. **Playability:** 8/10. **Graphics:** 3/10. **Value:** 8/10.



TETRIS

Have you heard the old saying that the simple games are the best? Here's another one to prove it. It will also give you sleepless nights and no doubt do irreparable damage to your brain. Games like this should carry a government health warning!

The screen display shows a plain rectangle and some "artistic" graphics that try to jazz up the screen however, all the action takes place in the rectangle. One after the other shapes tumble down from the top of the screen and rest when they either reach the bottom or fall on top of another piece. Using the joystick you can move the piece left and right as it falls and rotate it through 90, 180, 270 and 360 degrees by successive presses of the fire button.

The object of the game is to arrange the pieces so that they fit together to form complete lines across the rectangle (this means leaving no gaps). If you manage this your score goes up as the increasing pile of pieces moves down but if you allow the pieces to reach the top the game ends, probably with you hurling the joystick across the room in frustration.

The pieces are simple enough and consist of straight lines, L shapes, boxes, shapes and T shapes which fit together nicely if you get them in the right order but the game always seems to throw you exactly the wrong piece at the wrong time! This leaves you with some difficult juggling to do if you're going to stay in the game. That's all there is to it except to warn you not to go near it as you cannot just play it once. I played it solid for two days and with deadlines to meet that proved expensive. You have been warned!

Touchline:

Title: Tetris. **Supplier:** Mirrorsoft, Athene House, 66-73 Shoe Lane, London EC4P 4AB. **Tel:** 01-377 4645. **Machine:** C64.

Price: £8.99 (Ca) £12.99 (Disk).

Originality: 8/10. **Playability:** 9/10. **Graphics:** 5/10. **Value:** 9/10.

PHANTASIE III

This is (not surprisingly) the third in the SSI Phantasie series and tells the tales of your brave party of adventuring humans, elves, dwarves, gnomes and halflings joined

together in a common aim to stop the Dark Lord Nikademus from carrying out his plans to take over the world!

As you begin your quest your thoughts are far from the noble struggles ahead, instead you must concentrate on just staying alive as the massive Phantasie III world of wilderness, towns and dungeons is packed full of monsters that would love to add you to their menus and you shouldn't be surprised if your entire party is wiped out by the first encounter! In fact, this happens with alarming regularity so you'll get plenty of practice at creating characters and assembling parties. I found the best combination of characters was to have three fighters to beat up anything that moves, a thief to fire a bow, pick locks and disarm traps and a wizard and priest to cast spells and heal the many wounded.

Phantasie I and II players will be familiar with the basic game system in which you travel the land in search of clues, treasure and magic items and weapons that will help you in your quest but will appreciate the improvements made in the games graphics and gameplay. Now the bleak landscape is transformed into pseudo 3D. It still limps across the screen but at least now it looks better. As before you encounter foul creatures that roam the land but now the action is quicker and the cut and thrust of combat is accompanied by (limited) animation. Combat can be complicated as each character must decide whether they are going to stride manfully (suicidally) to the front of the party, stay in the middle or cower at the back, then whether they are going to thrust, attack, slash, parry, cast a spell or fire a bow and arrow. Then the action continues with the monsters battling you to the death until one of you drops. If you win the contest you may pick up some gold, some experience points and maybe even a useful magic potion, weapon or armour. If you all die then you're transported to the astral plane where a demon decides to destroy you or return you as one of the legion of the undead. You can still fight as normal but you need 15679600 experience points, instead of the usual 4-600, to reach the next level!



The parties accumulated experience is divided between the survivors when they enter a town and could mean an increase in level if they visited a guild. This level increase not only means more hit points to keep you alive longer but also three chances to improve your characters abilities such as their chance to hit, their ability to parry attacks and their skills at picking locks or disarming traps.

Eventually, you will build up a party of heavyweight characters that can survive a surprise attack from fire breathing dragons and be ready to track down and take on the Dark Lord himself. The best of the Phantasie games.

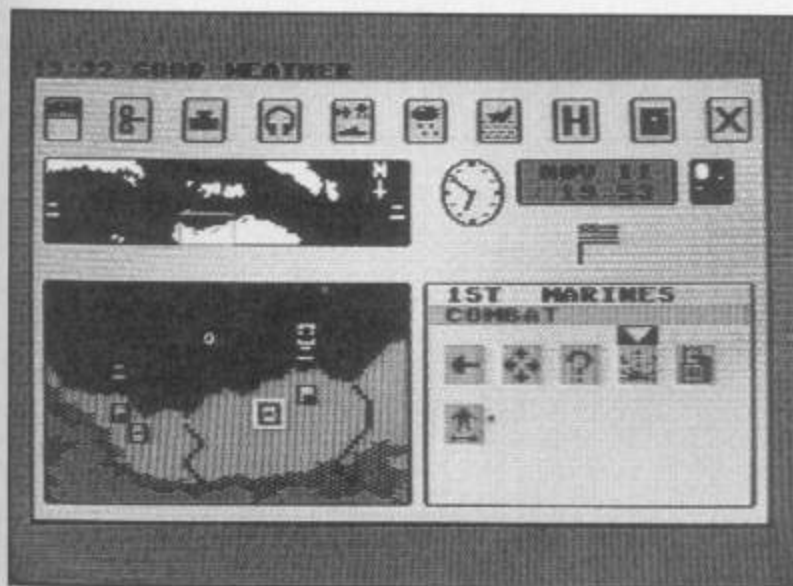
Touchline:

Title: Phantasie III. **Supplier:** SSI (US Gold), Units 2/3 Holford Way, Holford, Birmingham, B6 7AX. **Tel:** 021 356 3388. **Machine:** C64. **Price:** £19.99 (Disk only).

Originality: 7/10. **Playability:** 8/10. **Graphics:** 7/10. **Value:** 8/10.

GUADALCANAL

One of the bloodiest campaigns in the Pacific Theatre of World War II, the struggle for the island of Guadalcanal lasted five months starting in August 1942. Not only did action take place on the island itself, but also the surrounding seas as the American and Japanese navies struggled to maintain supplies to their own forces while simultaneously trying to destroy the enemy fleets.



The Activision wargame Guadalcanal gives you three main scenarios to attempt. A short three day campaign allows you to gain battle experience using the American forces before progressing onto the full campaign where you can play either side.

The game tries to encompass all the major elements of the campaign so the player will have to come to terms with fighting on land, at sea and in the air. Maintaining supplies to your troops, sending out scouts and seaplanes in order to discover the location of enemy forces and attempting to crack the enemy's codes while protecting your own are other vital skills.

Control of the game is via a series of ten main icons with many of these leading to a further selection of choices. There are two maps on screen, a small scale one of the area surrounding the island, a large scale scrolling map of the island itself. Units are depicted as tin flashing dots or single characters on the respective maps and I found that these were difficult to read at times. This was especially true when

it came to moving land based troops which involves moving a cursor on the large map and watching the course plotted appear on the small one.

My impression when playing Guadalcanal is that the authors tried to include too much with the result that playability has been sacrificed for authenticity. This is all the more so when coupled with a tricky control system and a poorly designed instruction manual. There is nothing wrong with complexity in a wargame and experienced wargamers will no doubt delight in getting to grips with this game. But for anyone wanting to try wargames for the first time, I would suggest that they look elsewhere.

G.R.H.

Touchline:

Title: Guadalcanal. **Supplier:** Activision, 23 Pond Street, Hampstead, London NW3 2PN. **Tel:** 01.431 1101. **Machine:** C64. **Price:** £9.99 (C) £14.99 (Disk).

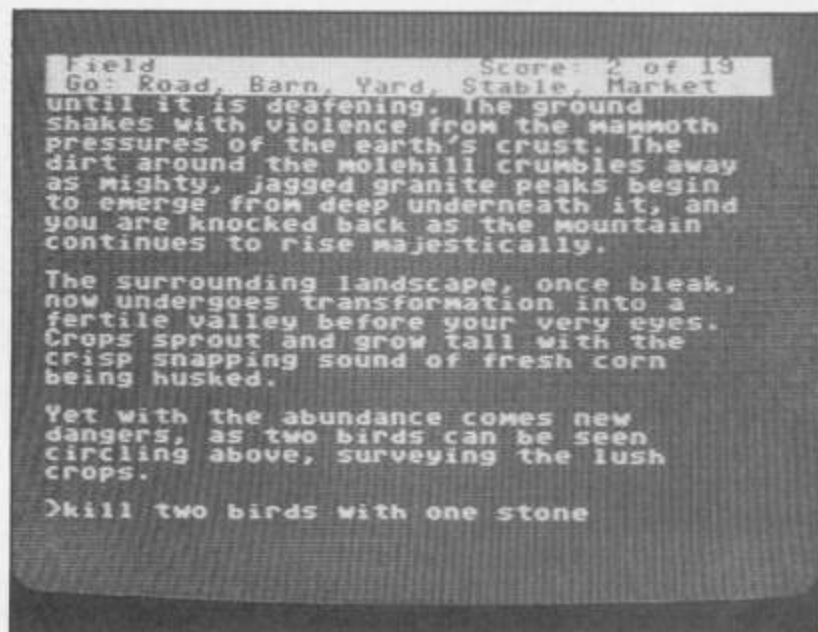
Originality: 8/10. **Graphics:** 5/10. **Playability:** 3/10. **Value:** 3/10 for beginners. **Value:** 7/10 otherwise.

NORD AND BERT

This is a departure from the normal Infocom style of games in so much as it is eight short stories rather than one long one. The idea is superb, the execution somewhat less so.

The stories are set around the town of Punster, a somewhat mixed up place desperately in need of sorting out. Each of the eight stories features a different type of word play — clichés, spoonerisms, proverbs, etc. For example, down on the farm, there are a number of things that need putting right. A field contains a molehill. How do you get rid of it? Simple, you make a mountain out of a molehill! Two birds are molesting your corn so you need to find a stone in order to kill them. And so on.

If this type of wordplay appeals to you, then all well and good but be warned, you will need to be very well versed in American idiom. The main problem with this game is that



there are too many answers that the average Brit will not know and so will have to resort to looking up the solutions (a series of solutions are included on the disk). I would not have minded the odd one but I found that I was having to cheat too many times and in my opinion, that does not represent good value for money especially at just under twenty-five pounds.

G.R.H.

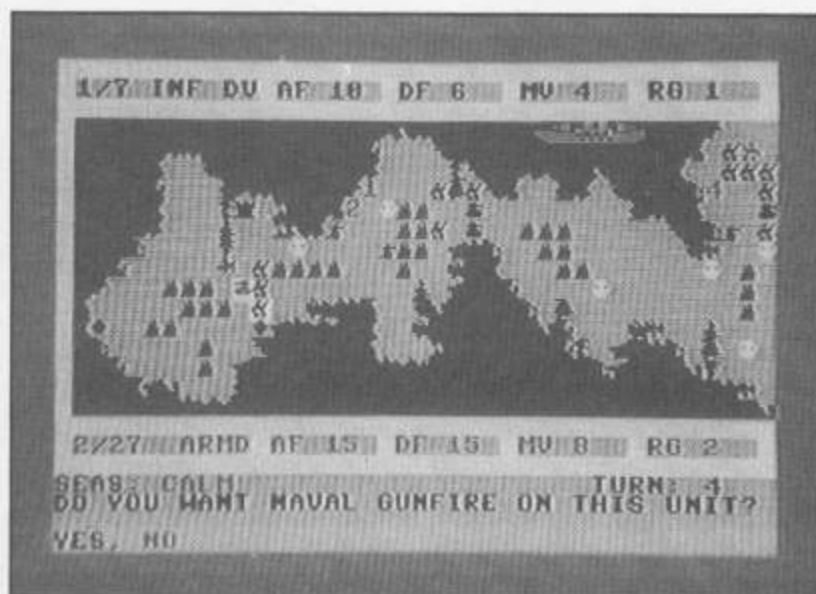
G.R.H.

Touchline:

Title: Nord and Bert Couldn't Make Head or Tail of it.
Supplier: Activision/Infocom, 23 Pond Street, Hampstead,
London NW3 2PN. **Tel:** 01-431 1101. **Machine:** C64 Disk
only. **Price:** £24.95.

Originality: 10/10. **Graphics:** n/a. **Playability:** 3/10. **Value:** 3/10.

OKINAWA



In Iwo Jima, also a PSS wargame, your task was to command US forces in their mission to take the vital Japanese island of Iwo Jima. Now in this latest of the Classic conflicts series you can command British and US forces as they storm the equally important island of Okinawa.

If you manage to take the island, you the Allies will be able to build an airbase from which they can launch an attack on Japan. However, this isn't going to be easy as there are thousands of Japanese troops, tanks and gun emplacements as well as submarines and kamakazi pilots to take out your naval support.

The game is played in turns in which you can either move or fire some or all of your units. If a unit moves it can't fire so you have to plan your advance well to direct your firepower in the right places at the right time. As the attack begins there are only Japanese forces on the island (and these are hidden) so you must land your troops at any of the seven selected sights, form a beach head and then drive on destroying all in your path.

As the battle rages you'll discover the relative strengths and abilities of infantry, tanks and artillery as well as when and where to use your naval gun support.

Historically, Okinawa was a dress rehearsal for the invasion of Japan, and the casualties you'll sustain will show you why the Allies altered their troop estimates from one to five million men and finally opted for the bomb. As a

wargame it plays well and the narrow craggy coast poses any joystick Generals with a difficult task. **T.H.**

T.H.

Touchline:

Title: Okinawa. **Supplier:** PSS, 452 Stoney Stanton Rd., Coventry, CV6 5DG. **Tel:** 0203 667556. **Machine:** C64. **Price:** £4.99 (Ca) £9.99 (Disk).

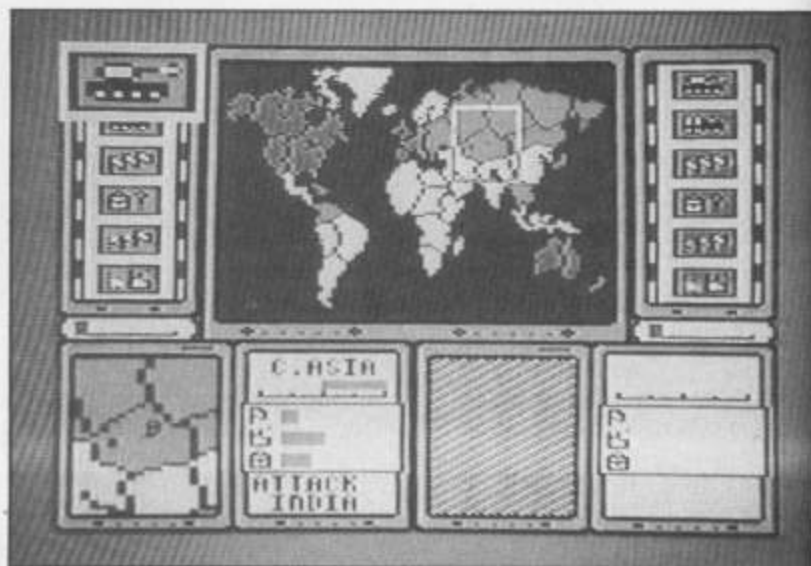
Originality: 4/10. **Playability:** 7/10. **Graphics:** 5/10. **Value:** 7/10.

POWER STRUGGLE

Are you a power mad meglomaniac? If not, here's your chance to see whether you could rule the world as you take control of the East or the West in PSS's Power Struggle.

When the game is loaded the program assigns either random countries to each power or the standard setup.

Power Struggle is played in timed turns in which you can issue as many orders as you have time for. If you run out of time you'll have to wait until the next turn by which time you may have lost control of the country.



To issue your orders you simply move a cursor across the map and highlight a country by pressing the fire button. This produces a display that shows the current strengths of that country's army, industry and political power and a second press will activate the command icons through which you can raise more troops, increase industry (industry can then produce armies in a later turn), attack an adjacent country, enforce (support) another country, supply (send industry) an adjacent country or politically infiltrate another state.

At the end of each turn the computer resolves any combat and the political colour of the world. If any states support you fully then you'll gain total control of them. Control the world and you'll win the game.

To succeed you have to perfect a difficult balancing act between military attacks and their heavy costs in troops and the more insidious political infiltration.

This isn't quite Colonial Conquest but as a low level power game you won't struggle to play it. **T.H.**

Touchline:

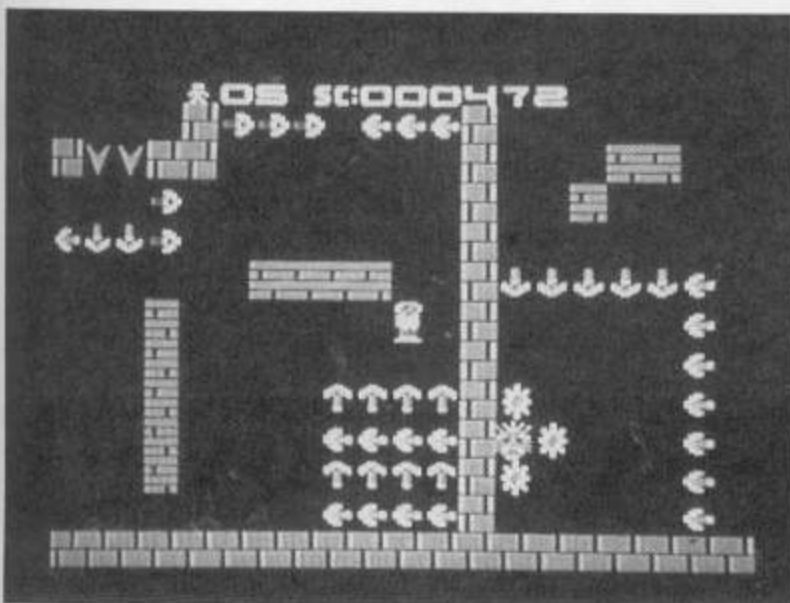
Title: Power Struggle. **Supplier:** PSS, 452 Stoney Stanton Rd., Coventry, CV6 5DG. **Tel:** 0203 667556. **Machine:** C64. **Price:** £4.99 (Ca) £9.99 (Disk).

Originality: 6/10. **Playability:** 7/10. **Graphics:** 5/10. **Value:** 6/10.

SARACEN

Datasoft's Saracen that's released through the Americana label by new publishers Mastertronic is one of those really addictive but irritating games that you just can't stop playing. The game casts you as Ilan the Crusader who must battle through 100 mazes to destroy 100 Saracen chiefs. In your way are walls that you can destroy with your arrows, Saracen soldiers that patrol the mazes and a selection of booby traps to kill the unwary.

To kill the Saracen Chief and reach the next level you must find and place a grenade (???) next to him and then detonate it with an arrow. However, to get the grenade and reach the Chief you will have to get past patrolling soldiers, blast your way through walls, find keys and then the locks they open, avoid killer traps and one way doors, exploding bombs and remove magic doors.



To help you survive you can pick up single shot, single direction arrows for your bow so you have to make sure you're holding the right arrow at the right time or you'll lose one of your lives.

Luckily, the game is friendly and allows you to continue your next game from the last level you reached, otherwise the game would be impossible.

T.H.

Touchline:

Title: Saracen. **Suppliers:** Americana (Mastertronic), 8-10 Paul Street, London EC2. **Tel:** 01-377 6880.

Machine: C64. **Price:** £2.99.

Originality: 6/10. **Playability:** 7/10. **Graphics:** 4/10. **Value:** 7/10.

WIZARD'S CROWN

Wizard's Crown combines the role playing action of other SSI games with strategic combat in which you can play every move and blow as you battle your way through a perilous quest to retrieve the priceless crown of the Emperor. The Crown has been stolen by the evil Wizard Tarmon and you and your brave party of adventurers must get it back.

The game begins in a town which has streets full of thugs and thieves to rob you but also provides some easy opponents for you to kill and build up your experience. Also in the town you'll find temples to pray in, Inns to rest in and shops to improve your weaponry.

Your party can have up to eight humans in it (no mixed races in this game) that can follow the discipline of Fighter, Ranger, Thief, Priest or Wizard. Each character class has their own strengths and abilities. For example, Wizards can wield powerful magic whereas Priests can pray to heal wounds.

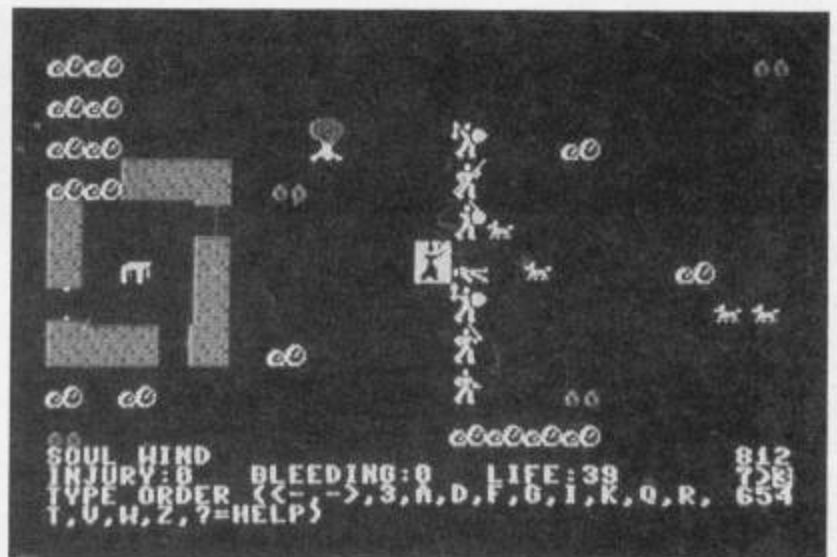
As you build up experience you can cash it in to improve each character's abilities such as skill in a specific weapon or in picking locks, turning the undead, haggle the best price and treat wounds with first aid.

When your party encounters some monsters you can decide whether to let the computer decide the outcome in quick combat or if you don't like this "hidden hand of death" style of play you can act out every cut, thrust and parry of the full battle. In full battle mode you must plan your parties formation to meet the onslaught and then wield swords and spells together to win the day. After the battle you may find items of use that you can pick up and get your priests to patch up any walking wounded.

Eventually, your party will grow in strength and wealth and soon will be ready to leave the relative safety of the town and explore the ruins where goblins lurk in alarming numbers and then on into your quest.

Wizard's Crown is an excellent mix of adventuring and combat and with a playing time of over 50 hours you won't get bored!

T.H.



Touchline:

Title: Wizard's Crown. **Supplier:** SSI (US Gold), 2/3 Holford Way, Holford, Birmingham B6 7AX. **Tel:** 021-356 3388.

Machine: C64. **Price:** £19.95 - disk only. **Originality:** 7/10.

Playability: 7/10. **Graphics:** 5/10. **Value:** 8/10.

Win a Copy of Jane's Fighting Ships



*Win this month's
competition and you could
be taking to the high seas
with your own copy of The
Hunt For Red October*

The Hunt For Red October, from Grand Slam Entertainments (was Argus Press Software) has already received some excellent reviews in the computer press.

Your Commodore is pleased to team up with Grand Slam Entertainments for this month's competition and this is a chance to win one of ten copies of the Hunt For Red October. Furthermore, the first winner out of the hat on the closing date will win their own copy of Jane's Fighting Ships. A rather expensive addition to your book collection.

For those of you not familiar with the scenario for Hunt For Red October, it is based on the book by Tom Clancy and you play the part of the captain of Russia's most advanced submarine, Red October. You are heading for the US of A - to defect. The Russians are of course out to stop you.

How to Enter

Study the two cartoons on this page, there are a number of differences between them. Once you have decided how many differences there are complete the entry coupon and send it to the editorial address (see the coupon). Write the number of differences that you have found on the back of the envelope. If you don't your entry will not be accepted.

The Rules

Entries will not be accepted from employees of Argus Specialist Publications and Grand Slam Entertainments. This restriction also applies to employees' families and agents of the companies.

The How to Enter section forms part of the rules. The Editor's decision is final and no correspondence will be entered into.

Red October Entry Coupon

Name.....

Address

.....Postcode

Number of differences found

If I win I would like the format of my copy of Hunt for Red October to be:

Commodore 64 tape

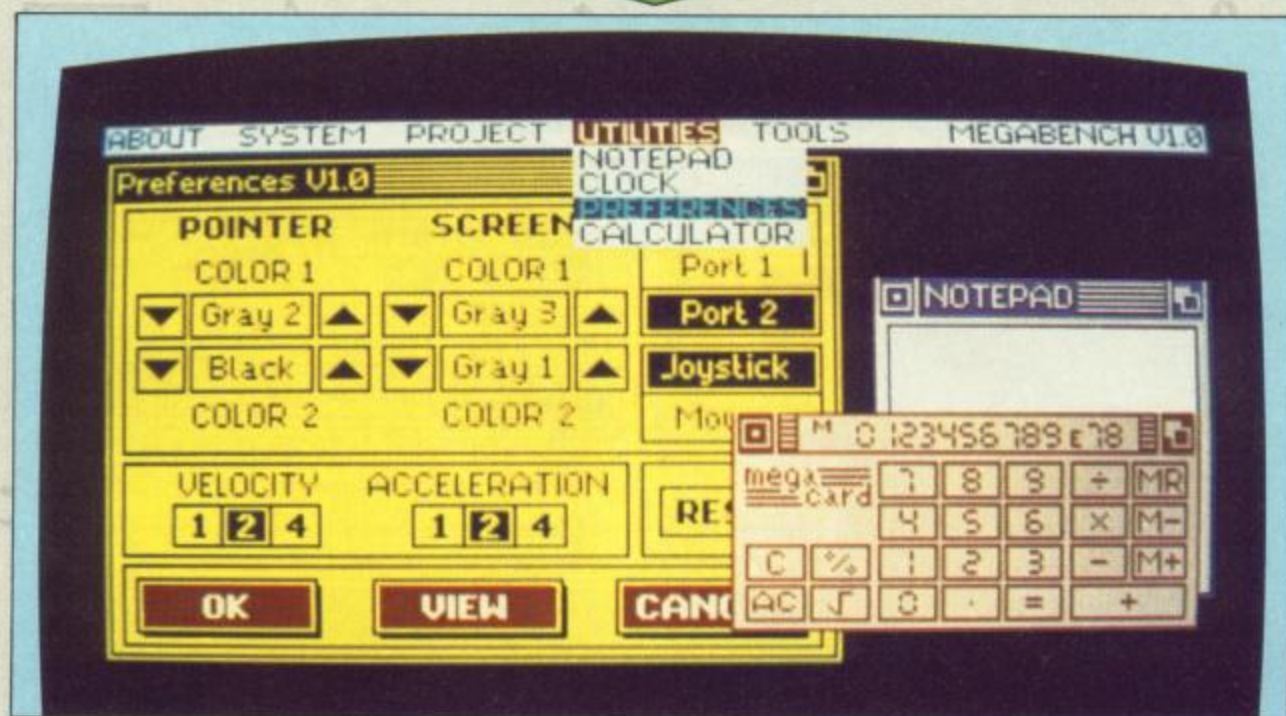
Commodore 64 disk

Amiga disk.....

(please tick as appropriate)

Post to: Your Commodore,
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London W1R 3AB.

KEEP IT SIMPLE!



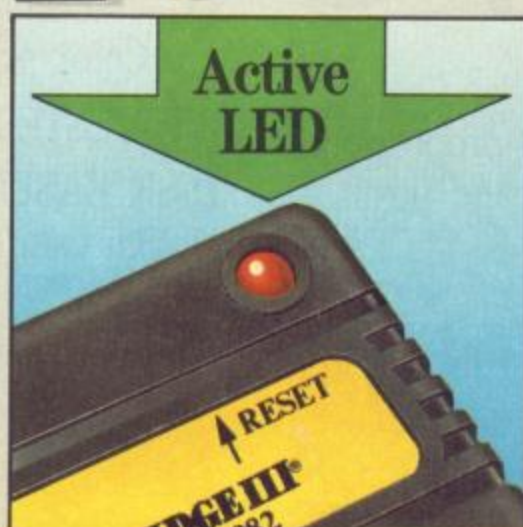
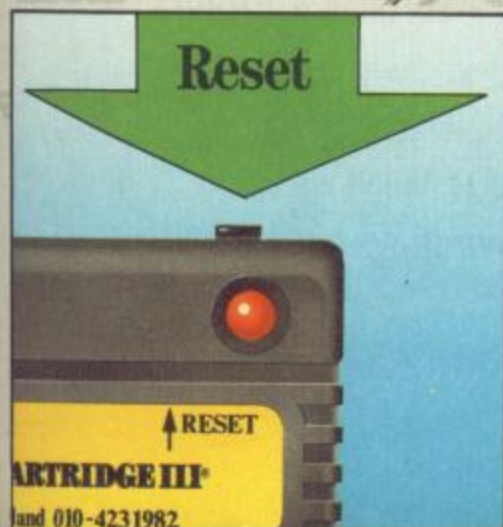
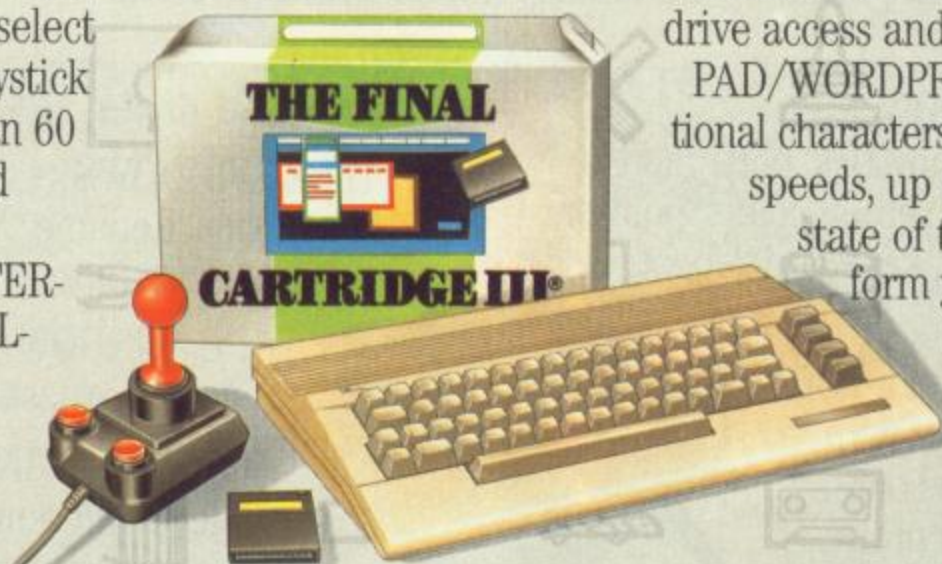
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Selects: mouse port, joystick port, mouse speed, joystick speed, screen colors, pointer colors, keyboard click, keyboard repeat.

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Enables you to open directories from different

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TAPE WINDOW

Activates fast and normal modes.

PRINTER WINDOWS

Select different printers, such as Commodore serial, Centronics, RS 232, Color printers.

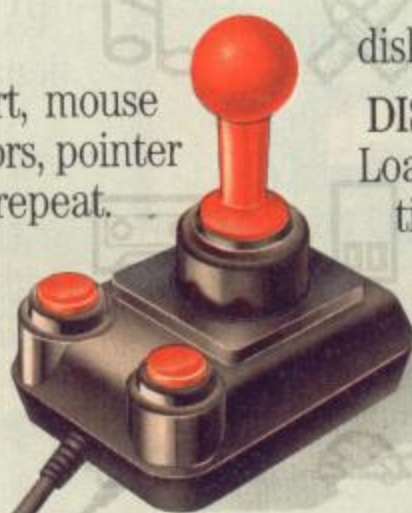
REQUESTER WINDOWS

DISK BASED USER WINDOWS

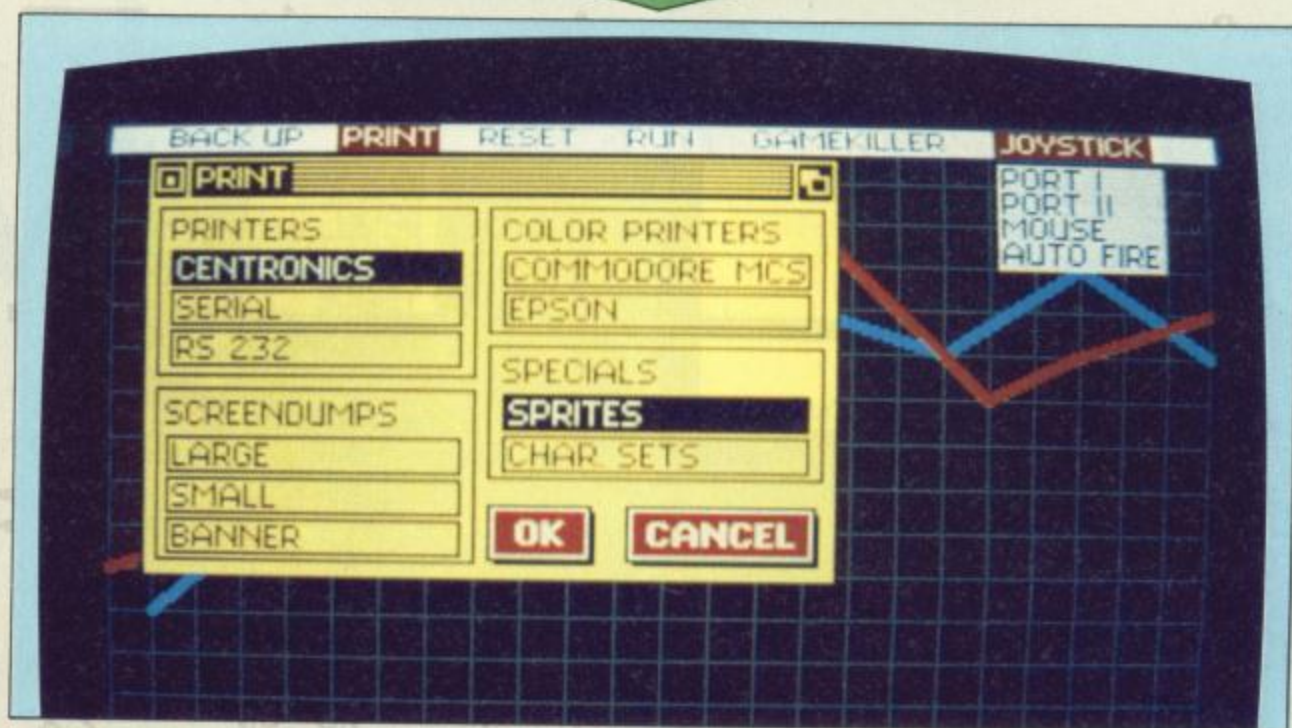
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Almost all commands and functions that are not activated by windows can be selected from a menu bar, which appears on top of the screen after pressing the fire button, either in Basic or from the freezer. The following Basic Toolkit and keyboard extra's are included:

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- Append • DAppend • DSave • DOS • Monitor
- Drive monitor • Sprite editing
- Centronics interface • Fast format • Low Res screendumps
- Plist • Scrolling up and

- down • Stops and continues listings • Preprogrammed functionkeys • Packer/Cruncher
- Hex to decimal conversion • Pokes, syscalls and variables may all have Hexadecimal values • Trace, Dump, Order, Mem.

1) In 64 mode only. Colors simulated, specifications may change without notice.



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Adventure Kit IV

This month we look at the all important role of the parser

By Allen Webb

The parser is one of most crucial parts of any adventure. This routine converts the input text into individual words and checks whether they are in the game's vocabulary. In my opinion there is an excessive amount of snobbery associated with parsers. The early Scott Adams games recognised only verb/noun combinations and were therefore tedious to use. Newer parsers such as those in the Pawn are highly complex and will handle a wide range of inputs. I find that such complexity is unnecessary and some compromise is adequate. I will now go on to describe a parser which goes some of the way to provide acceptable performance.

In order to keep the code to a reasonable size, the parser makes certain assumptions as to the form of the text. These, however, are not unreasonable. The parser starts at the beginning of the sentence and scans each word in sequence. Any occurrence of "the" is ignored and scanning continues until either seven acceptable words are found or until the end of the sentence is reached. Most words can be of differing forms and there are standard checking routines for each. The acceptable forms are:



Word 1	Word 2	Word 3	Word 4	Word 5	Word 6	Word 7
Verb	Noun 1	Noun 1	Noun 1/2	Noun 2	Noun 2	Noun 2
	Adj 1	Adj 1	Adj 2	Adj 2	Adj 2	
	Adv	With	With	With		
	With	To	To	To		
	To	Adv	Adv	Text		
	Text		Text			

The results of the scanning process are returned in eight registers. Registers NOUN1, NOUN2, ADJ1, ADJ2 and ADV hold the number of the relevant word. This number refers to the word's position in the

vocabulary tables. The registers WITH and TO hold 1 if the corresponding word is present otherwise they hold 0. The spoke word is also checked. To indicate speech, the relevant text is enclosed in quotes. If

text is found, a register called TLEN returns the length of the text. The text is returned in a buffer.

I'll explain the parser's operation with some examples:

• **Input: LOOK**

VERB: LOOK
ADVERB:
ADJ1:
NOUN1:
ADJ2:
NOUN2:
WITH:
TO:
SPEECH:

• **Input: KILL THE GREEN DRAGON WITH THE LARGE SWORD**

VERB: KILL
ADVERB:
ADJ1: GREEN
NOUN1: DRAGON
ADJ2: LARGE
NOUN2: SWORD
WITH: 1
TO:
SPEECH:

• **Input: TAKE THE SWORD QUICKLY TO THE ANGRY GNOME**

VERB: TAKE
ADVERB: QUICKLY
ADJ1:
NOUN1: SWORD
ADJ2: ANGRY
NOUN2: GNOME
WITH:
TO: 1
SPEECH:

• **Input: SAY "HELLO" TO THE GORILLA**

VERB: SAY
ADVERB:
ADJ1:
NOUN1:
ADJ2:
NOUN2: GORILLA
WITH:
TO: 1
SPEECH: HELLO

• **Input: ASK THE DWARF "WHAT IS THE TIME"**

VERB: ASK
ADVERB:
ADJ1:
NOUN1:

ADJ2:
NOUN2: DWARF
WITH:
TO:
SPEECH: WHAT IS THE TIME

• **Input: LOOK IN THE HOLE**

VERB: LOOK
ADVERB: IN
ADJ1:
NOUN1:
ADJ2:
NOUN2: HOLE
WITH:
TO:
SPEECH:

To use the parser, you use the instruction SYS 7*4096. A prompt will appear near the bottom of the screen. You type in the text and press RETURN when finished. The results of the parser are then returned in the following locations:

Location	
VERB:	880
ADVERB:	881
ADJ1:	882
NOUN1:	883

ADJ2:	884
NOUN2:	885
WITH:	886
TO:	887
SPEECH:	starting at 49920
TLEN:	896

ERROR 1:	888
ERROR 2:	889
ERROR 3:	890
ERROR 4:	891
ERROR 5:	892
ERROR 6:	893
ERROR 7:	894
ERROR:	897

If a word is not recognised then the corresponding error register is set to 255 (it normally holds 0). ERROR1, for example, relates to WORD 1. All seven error registers are Ored together to get an overall error register (ERROR). This allows you to use a single value to check whether an input is acceptable. Lines 590 to 740 of the editor show how the parser can be used.

The parser code occupies the memory from \$7000 to \$74B2 (28672-29874).

The vocabulary is held in four tables as follows:

VERBS \$7500-\$78FF	255 words
NOUNS \$7900-\$7CFF	255 words
ADJECTIVES \$7DOO-\$7DFF	63 words
ADVERBS \$7EOO-\$7EFF	63 words

The numbers of words in each table are kept in four locations:

VERBS	29875
NOUNS	29876
ADJECTIVES	29877
ADVERBS	29878

The editor provides the means to create your vocabulary. The SAVE option saves both the words tables and the locations holding the table lengths.

So how do you use the parser? The best way is to use a routine for each verb. You then use an ON GOTO or on GOSUB to execute the verb. Here is an example:

```
1000 SYS 7*4096: IF PEEK(897)=255
THEN PRINT "ERROR IN INPUT":
GOTO 1000
1010 ON PEEK(880)
GOTO 2000,3000,4000,....
```

Each subroutine would then examine the rest of the input words

and take appropriate action. The parser doesn't recognise synonyms, you'll have to do that.

The parser uses line 22 by default for the input. If you want to change this, include the following line in your program:

POKE 28722, LN

where LN is the prompt line and has values between 0 to 24. It is unwise to use a value greater than 23 since a long input will force the screen to scroll.

The use of the parser and the subsequent interpretation of text is the trickiest part of writing an adventure so be careful to think things through. Try to anticipate nonsensical inputs and try to use witty responses. There is nothing more tedious than getting a repeated reply such as "You can't do that" or "I don't understand".

In the final part of this series, I will look at windows and an interrupt driven event timer.

Morse Code Tutor

*Practicing for telecommunication exams in morse code
can be made easier with this utility*

By Geoff Hackworth

Records and cassettes have been created to aid learning morse code, but the strings of letters soon become familiar after listening to them many times (as you would normally have to unless you were some kind of genius!). The solution is to find someone who can send you random letters in morse code but why bother when this computer program is all you need?

The Program

The program is designed to aid the learning of morse code by emitting random letters selected from a specific list which you have selected for the test. In this way you could learn the alphabet in stages. For example, selecting the letters ABCDEF means that the computer will randomly choose from this range when it tests you.

The program also provides the facility for the user to type in a string of text using any of the characters shown in Figure 1. The computer will now send this message instead of random letters. The string can be up to 717 characters in length (including any spaces). This allows a tutor to type in real words or messages for the learner to receive as a change from deciphering random characters.

Getting it in

The program is presented in the form of a Basic loader with each line of data having a checksum (to reduce errors). Once you've typed it all in, save the program to disk or cassette. Before I go on, some of you may have noticed that the actual machine code starts at 2049, the beginning of Basic! No, I'm not crazy, this is so you don't have to remember a SYS number whenever you want to use it. The very first part of the data in the loader program

corresponds to a basic line containing a SYS call.

Before you attempt to run the loader (which would result in a crash as it will attempt to poke the data in on top of itself!) remove the 'POKEAD,DT' from line 60 but leave the rest of the line intact. Now you can safely RUN the program and sort out any checksum errors without the program actually POKEing the data anywhere. Once you have corrected all the errors, put back the 'POKEAD,DT' into line 60 (make sure it's in the original place) and resave the program.

Now you must move the bottom of Basic up out of the way of the machine code pokes. Do this by typing 'POKE6656,0:POKE43,1:POKE44,26:CLR:NEW'. Now LOAD in the Basic loader again and RUN it. The machine code will now be poked into memory. Once this has been done you now have to save the MORSE CODE program as a standalone program. To do this, type 'POKE43,1:POKE44,8:POKE45,135:POKE46,25:SAVE"filename"'. Add an ',8' if you are using disk. The MORSE CODE program will be saved. The program can now be RUN.

Using the program

Once operational, Morse Code Tutor presents you with a main menu screen displaying various parameters which can be changed and the three main options. Before I describe the options I will explain the parameters.

The parameters which can be changed are the current words-per-minute speed (WPM), the delay between letters and words (given in terms of 'dot' lengths) and the number of groups to be sent. The latter is only used in option 3 next page. The delay between words is always four more dots than the delay between letters,

thus changing the delay between letters will automatically cause a change in the delay between words. To change the parameters use the keys F5 for the number of groups.

Option 1 - Select Characters for the test. This option enables the user to specify which characters are to be enabled or disabled when the computer randomly selects characters in Option 3.

All possible characters are shown on the screen and all those characters in reverse video are currently enabled. Thus pressing the key corresponding to a presently enabled character will set the character to normal video on screen to show that it is now deselected. Pressing 'F1' while pressing 'F3' will characters, whilst pressing 'F3' will disable them all. As a further help to selecting characters they are segregated on screen into three groups, these being letters, numbers and punctuation. Pressing 'CTRL+L' will toggle all the letters, while 'CTRL+N' and 'CTRL+P' will toggle all of the numbers and all of the punctuation respectively. Once you have made your selection press 'F8' to return to the main menu.

Option 2 - Input string to be sent. This option lets you type in a string of text which uses any of the characters in Figure 1. This can then be sent back at the current WPM speed and using the current delays between letters and words (as set on the main menu screen). The pair of square brackets ('[' and ']') indicate the available space for your text (717 characters).

Once you have finished typing in your text, pressing RETURN will send the string you have just typed in. You can press 'F8' to abort this stage and you are then asked for another string of text, your previous message is not

retained. You may press 'F8' again to return to the main menu screen.

Option 3 - Begin Test. This is the most powerful option, it will send you groups of five random characters (selected from those enabled in Option 1) at the current WPM speed, with the current delay between letters and words (as set on the main menu screen).

The number of groups setting on the main menu screen determines how many groups of five characters will be

sent. Pressing '3' on the main screen will enter this option. You are asked to wait while the computer selects the characters which it is going to send to you (the border flashes during this process). This usually only takes a few seconds, but may be longer if you have only enabled a few characters in Option 1. If no characters are enabled then you are returned immediately to the main menu screen.

When the computer has finished sending the message it displays the

characters it has sent, in groups of five, waiting for a keypress between each display. After all the groups have been displayed you are asked to press any key to return to the main menu screen. If, during the sending of the groups you press 'F8' then sending will stop and you are shown only the characters which were sent before 'F8' was pressed.

Please note that whenever the computer is asked to send any morse code (in either option 2 or 3) it calculates the timing according to the WPM speed, delays between letters and words and it also takes account of the average lengths, in time, of the characters which are currently enabled (Option 2 enables all of the characters because they may all be used). Thus when some combinations of characters are enabled and sent at a certain WPM and delay setting, the actual lengths of the dots and dashes may sound different when compared to those when other combinations of characters are selected. As an example of this, consider only the letters EIST as being enabled. In terms of 'length' in time they are short, so the individual dots and dashes will sound longer than if only the punctuation characters were enabled (which are much 'longer' than the letters EIST. So the program takes account of this fact when calculating how long to make each dot and dash. A similar effect is noticed when changing the delays between letters and words. A similar effect is noticed when changing the delays between letters and words. A larger delay causes the dots and dashes to be shorter so that the WPM setting is still accurate, ensuring that the same number of words is sent in the fixed amount of time. This may take some getting used to, but if the sending is too slow or too fast for you, just abort it and change the WPM speed to take account of the previous changes you made.

Note that in true morse the delay between letters is three dots, but I have allowed this to be extended so that the learner is given more time to think about what they have just heard before another character is sent. You should eventually be able to receive with the delay at three dots.

Also note that in morse code the delay between dots and dashes of a letter (i.e. the delay between the dot and the dash of the letter 'A') is equivalent in time to the length of a dot. A dash is always three times as long as a dot.

Figure 1

Char	Morse	Char	Morse
A	· —	Y	— · — · —
B	— · · ·	Z	— — · — ·
C	— · — ·	1	· — — — —
D	— · ·	2	· · — — —
E	·	3	· · · — —
F	· · — —	4	· · · —
G	— — — ·	5	· · · ·
H	· · · ·	6	— · · · ·
I	· ·	7	— — — · ·
J	· — — — —	8	— — — — ·
K	— · — —	9	— — — — — ·
L	· — — ·	0	— — — — —
M	— —	.	· — — · — —
N	— ·	,	— — — — —
O	— — — —	:	— — — — — ·
P	· — — — ·	?	· · — — — ·
Q	— — — · —	✓	· — — — — —
R	· — — ·	—	— — — — —
S	· · ·	/	— · — — —
T	—	<	— · — — — ·
U	· · — —	>	— — — — — ·
V	· · · —	=	— — — — —
W	· — — —	//	· — — — — ·
X	— · — ·		

Compilations

*If value for money is the order of the day,
cast your eye over our collection of
compilation games and decide how to
spend your Christmas cash*

By Tony Hetherington

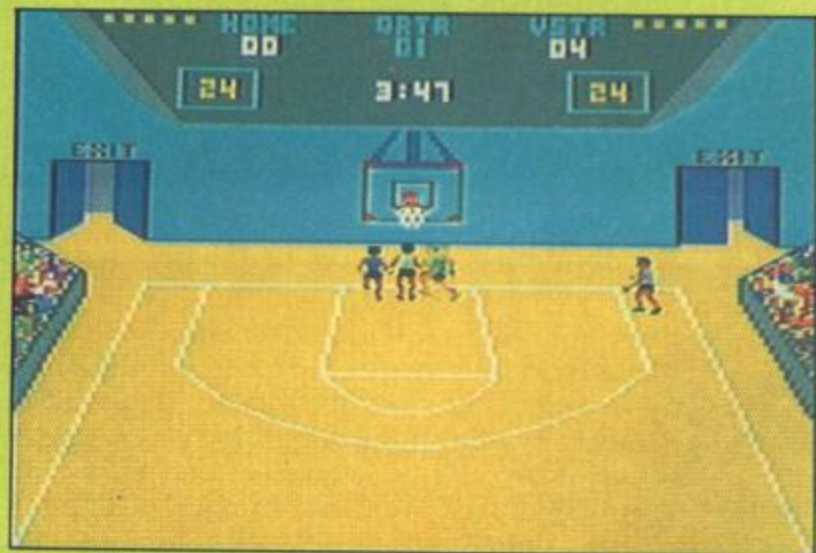
As the nights get longer and the days get colder the software houses turn to compilations that pack a punch to warm the cockles of your computer. The shop shelves are bulging with compilations that offer not only two games for the price of one but also four, six, eight, ten and twelve!

Last month's game of the month went to US Gold's Solid Gold Compilation that featured Winter Games, Ace of Aces, Infiltrator, Leader Board and Gauntlet; all for £9.99! Now this has been joined by compilations from the pick of the software houses that range from double packs to giant packs. We look at the top contenders for your Christmas cash.

Software Projects has compiled two double decks featuring both conversion of the video disk coin-op machine Dragon's Lair and the two games that are now part of software history. Manic Miner and the sequel Jet Set Willy started the Platform game craze in the UK and now you can get both of them for just £2.99!

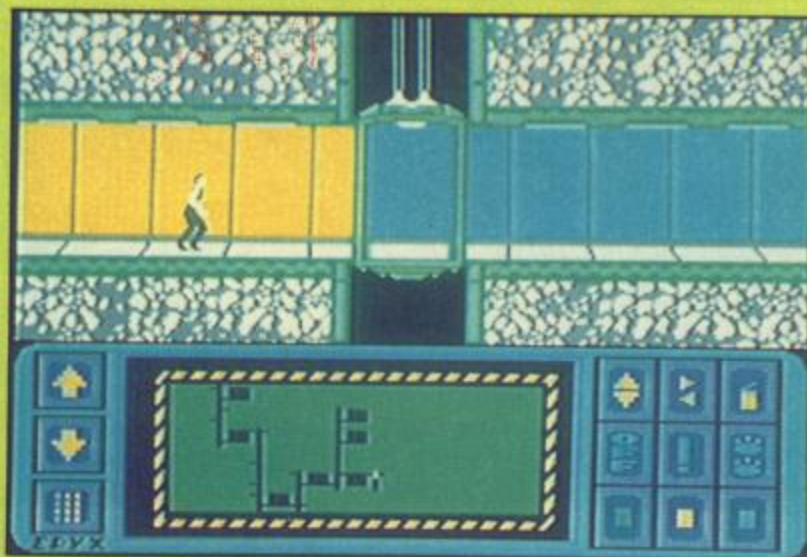
Dragon's Lair was the first video disk arcade machine in which Dirk the Daring battled through whirl pools, rode flying legless horses and finally defeated Singe the Dragon. Now you can tread in Dirk's footsteps in Dragon's Lair and Escape from Singe's Castle which together offer a comprehensive conversion of this coin-op classic.

Sports fans will find great value for money in Ocean's Game Set and Match which contains ten games and over 20 different events. First on the plate is Imagine's World Series Baseball, which is quickly followed by a set of Match Point and the excellent Jonah Barrington's Squash, a frame of Vision Snooker, a match of Super Soccer, a season of Gamestar's Two on Two Basketball, a game of Konami's Ping Pong and eight rounds of Activision's Barry McGuigan's Boxing. If you've got any stamina after that lot you can tackle Daley Thompson's Supertests that will have you shooting, cycling, diving, skiing, rowing, penalty kicking, ski jumping and tug o' warring with the great man. Or you can try the swimming, skeet shooting, weight lifting and archery of Hyper Sports. Guaranteed to break your joystick but not the bank.



Two on Two

Two on Two Basketball is also available on the Gamestar (Activision) Sportspack that also contains Championship Baseball and GFL Championship Football (American).



Impossible Mission

Hypersports was one of the last "events" games from Ocean (Konami) who started it all with Daley Thompson's Decathlon. Since then American giants, Epyx, has taken over with its series of Winter Games, World Games and now California Games. Its first, Summer Games, just missed out on the Decathlon craze but is now back on the Epyx Epics compilation from US Gold which also includes the high speed, split screen, racing action of Pitstop II, the superb walking, talking, fiendish Impossible Mission and the Moon Walks and Head Spins of Breadance.

If Epyx has dominated the sports scene then there can be no doubt that Elite is the King of the coin-op conversions. Now you can buy the best of Elite for only £14.99. In a double tape pack you get one of my all time favourites, Paperboy along with Frank Bruno's Boxing, Commando, Bombjack, Airwolf, Ghosts and Goblins, Space Harrier and Bombjack II!

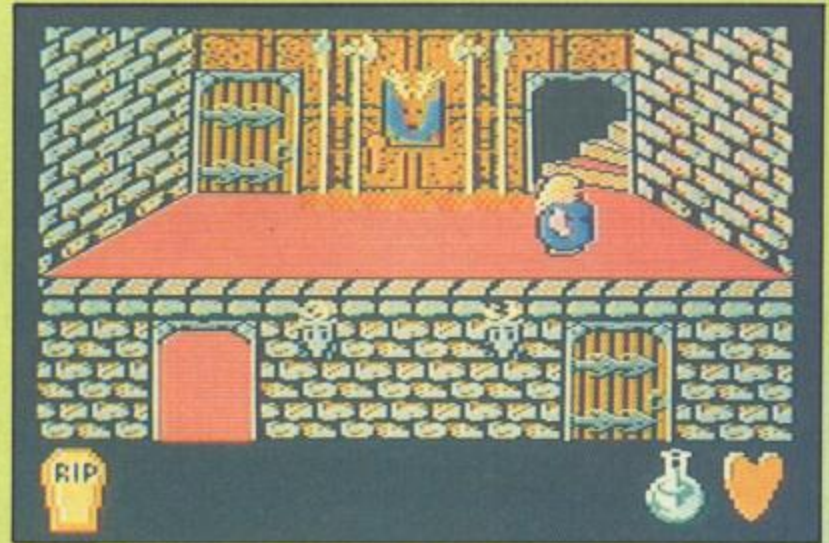


Paper Boy

If you think eight games for the price of one is good value then what about Beau Jolly's ten Computer Hits 4 which now includes two free games bringing the total to 12 games for £9.95! Remember Hewson's futuristic racing shoot 'em up called Alleykat, Martech's judo game Uchi Mata and Electric Dream's Spindizzy? Well, they're joined by Bride of Frankenstein (Reaktor), Classic Snooker and Magic Madness (Anco), Sacred Armour of Antiriad (Palace), Deactivators (Ariolasoft), Skaterock and Starquake (Bubblebus), Hewson style Minter Madness in Iridis Alpha and Dandy (Electric Dreams) which are all packed on to a single tape.

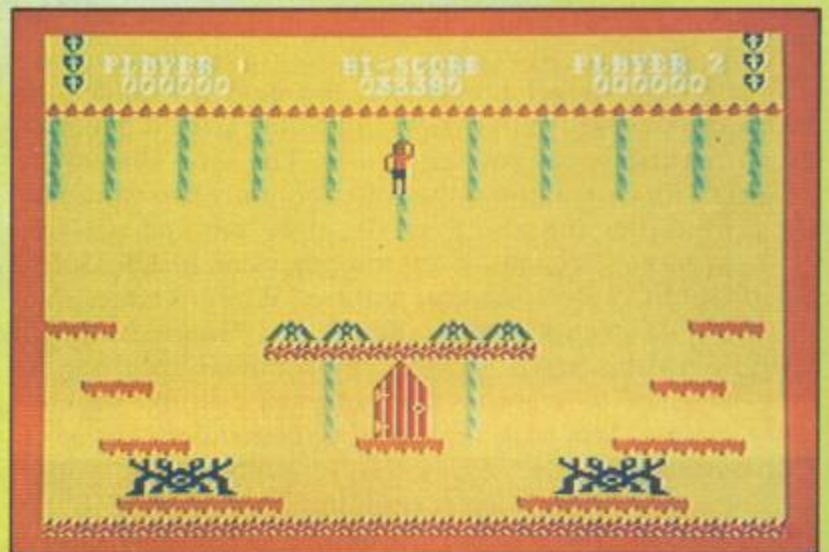


Uchi Mata



Bride of Frankenstein

Ocean offer action and adventure all the way in their Live Ammo (£9.95) compilation in which you can carry out Army Moves, blast anything in sight as Rambo or as Green Beret, take to the skies in the dogfight action of breakout of a POW camp in the Great Escape. Choose your weapons, my pick would be the tense prisoner of war adventure of The Great Escape.



Power House

The Power House consider their compilation of eight budget games a "software album" and so the games on Power Plays are still available individually or you get the lot and save yourself some cash. For your money you'll get one of the most addictive platform games ever written in



Battle of Britain

Hercules and its sequel God's and Heroes, the shoot 'em ups Terminator, Aftermath, Space Warrior, Xenon Ranger and Gun Runner and the puzzling maze exploration game Squij!

Wargamers needn't feel left out of the compilations craze as PSS have released Conflicts I containing three strategic simulations. Now you can recreate the Battle of Britain, the conquest of Falklands 82 and fight the controversial Theatre Europe all for the cost of a single cassette.

Ten great games for the price of one is the offer from Gremlin Graphics. If you take it up, and you should, you'll be able to delve into the Gauntlet clone Avenger, explore the scrolling platform game shoot 'em up adventure that's Future Knight, knock the bricks out of Krakout, bounce to glory in Bounde and shoot to the top in Footballer of the Year. If you've got any life left in your joystick after that lot you can run the race of your life in the exceptional Trailblazer, blast the 3D nasties of Highway Encounter, join Monty on the Run, rob the West Bank or be as naughty as you can as Jack the Nipper. Krakout, Bounder, Future Knight and Trailblazer have got to be worth £9.99 on their own and with games like Avenger and Monty on the Run as a bonus it just has to be a winner.

US Gold has another compilation of past hits but you'll have to search out the nearest WH Smiths to find it as Play it Again is only available there. For your £9.99 you'll receive a pack that contains the murder mystery Killed Until Dead, 10th Frame (Ten Pin Bowling C64 style), English Software's Leviathan, Infiltrator and the hit and hope Access golf

smash Leader Board as well as the four extra courses included in Leader Board Tournament.

Finally, you can pick up a compilation of ten games and help the fight against cruelty to children. As you play games such as Bounty Bob Strikes Back (US Gold), Skyfox (Electronic Arts), Monty on the Run (Gremlin) and Elektraglide (English) the proceeds of the sales will be helping the NSPCC and RSPCC to stamp out cruelty to kids. It couldn't be easier, in fact, it's kidsplay.



Skyfox

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Please contact this address for prices and availability.

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What programs are available?

At the top of each article you will find a strap containing the article type, C64 Program etc. So that you can see which programs are available on which format, you will also find a couple of symbols after this strap. The symbols have the following meaning:



This symbol means that the program is available on cassette.



These programs are available on disk.

Please Note

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Poker Face

*If your latest game always leaves you at death's door,
this could pull you through!*

By Norman Doyle

Is it a book? Is it a magazine? No, it's *What Poke?* – a collection of hints, tips, cheats and potted reviews from H & D Services.

Once upon a time, the computer gaming fraternity used to be an unofficial gentleman's club. Games were there to play and cheats were frowned upon. This has all changed since people realised that some games are impossible without a little assistance and now the caddish pastime of PEEKs and POKEs has become a major, magazine money-spinner.

What Poke? strips away the trimmings of the traditional magazine and concentrates heavily on maps, hints, solutions and, of course, the pokes themselves.

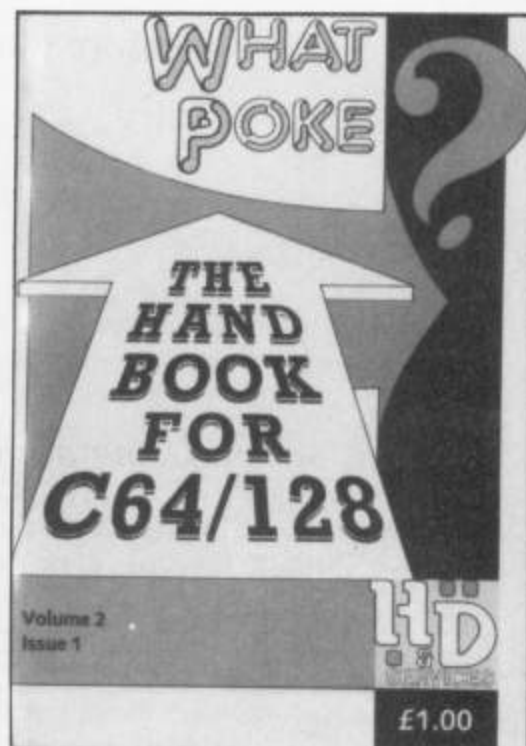
Despite classifying itself as a magazine, the editorial team are out to bust the image of the A4 format by printing as an A5 booklet. This has the advantage of producing a stiff-backed handbook which is easily stored on your bookshelf.

The series of books are broken down into subject areas. C16 owners have a separate issue from C64

owners, and adventures are treated on their own as a specialist pursuit.

In the 70 pages of the first issue of the C64 Volume 2, there are 41 pokes, seven maps, two hints and two solutions. The rest of the magazine consists of reviews and features written in a very sketchy fashion.

After reading the Kill! Kill! Kill! attitude towards traditional magazines in the introductory pages, I expected a little more acidity. The editorial implies that the established monthlies are in the pockets of the advertisers. Although this may be true



for the colour blue although I know other people would disagree.

The reviews are 'bottom liners', they say nothing much about the game and then you are given the opinions of a panel of reviewers. Taking the overall impression, it just goes to prove that one man's meat is another man's poison. The review of Reaktor's Killer Ring, for example has comments ranging from 'totally average' to 'an excellent shoot-em-up'.

Still, this is not the purpose of *What Poke?* Its main fare is cheats and lots of them. If this is your main aim in life, the magazine delivers the goods but I feel that you're still paying for a fair degree of wallpaper compared to the traditional, colourful, informative monthly magazine. Despite its thickness, *What Poke?* has not transcended its beginnings as a broadsheet, only the price has changed.

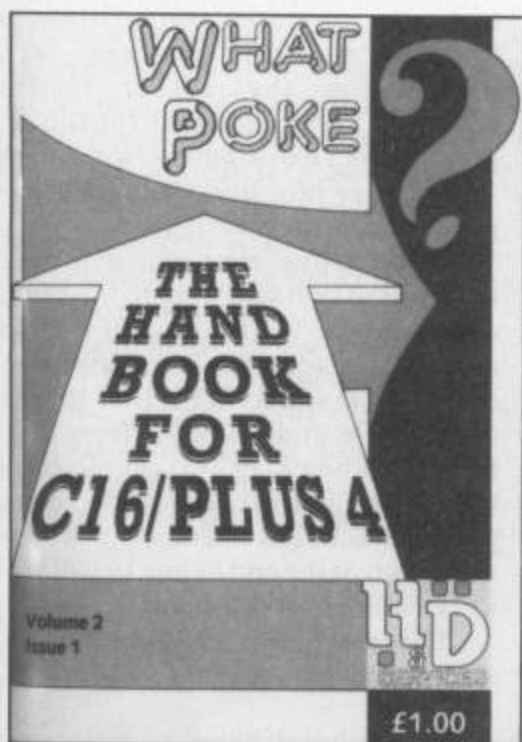
Touchline:

Name: *What Poke?* **Publisher:** H & D Services, 1338 Ashton Old Road, Higher Openshaw, Manchester M11 1JG. **Price:** £1.00.



of one or two less reputable rags. I know that this is a popular myth. Some companies do get soft treatment at the hands of the reviewers but this is a result of a generally good track record. It's very similar to the way that a U2 fan would never admit that the band has produced a few trashy records. At least one of the reviews in *What Poke?* shows a sycophantic attitude towards Hewson's Zynaps so they can't claim to be free of this reviewer's disease.

A review is personal opinion and I would wax lyrical about my preference



Get The Point

Using a pointer to select menu options turns a mundane task into a pleasure.

By Martin Reddy

The Amiga uses an arrow to select options from the screen and the pull-down menus. You don't have to buy GEOS to add this to your C64 when just 536 bytes of program will do the job for you.

This program runs on an interrupt and allows as much flexibility as possible. Under program control or in direct mode, you can either find the character under the arrow or retrieve the XY co-ordinates of the arrow.

PEEKing location 820 will reveal the screen code of the character under the arrow cursor. If this is not required, then PEEK(822) will reveal the X co-ordinate of the cursor position while 823 stores the Y co-ordinate.

As this routine can be put to many uses, the cursor colour may need to be changed according to the background. Any colour can be selected simply by poking its numerical value into location 821.

The speed of the arrow can also be altered through location 40307 (\$9D73). This contains the default value of 8 at first but any value from 1 to 255 can be poked in. The rule to follow is that the lower the value, the faster the speed at which the cursor moves.

The program is stored at the top of the Basic memory at locations 40000 to

40535 (\$9C40-\$9E57). This means that it will work in conjunction with most machine code and Basic programs. In the latter case you should make sure that you lower the top of Basic to prevent variable storage from overwriting the cursor control program. Try using it with the window generator (*Your Commodore* August 1987) to see how any program can be given that professional touch.

If an arrow isn't suited to your application or if you want to use Multi-colour mode, the shape of the cursor can be altered. The character definition is stored in the first 16 bytes of the code and takes the form of an 8x16 pixel block, or two characters on top of one another. If you do change the character, remember that the checksum at the end of line 10 will have to be altered accordingly.

The interrupt is set in operation by SYS 40000.

YC





Listings

*Get it right first time with our deluxe program system
for the C64.*

You may have noticed that our listings are free of those horrible little black blobs which send you searching around the keyboard for a suitable graphic symbol. You may also have noticed the funny numbers by the side of each line of the listing. Fret no more, it's all part of our easy entry aid.

Instead of those nasty graphics and rows of countless spaces in PRINT statements and strings we use a special coding system. The code, or mnemonic, is always contained in square brackets and you'll soon learn to decipher their meanings.

For example, [SA] would mean type in a Shifted A, or an ace of spades in layman's terms, and [SA10] would mean a row of ten of these symbols.

[S+2] means hold down the shift key and press the plus key twice. It doesn't take a great leap of logic to realise that [C+2] means exactly the same thing except that the Commodore key (bottom left of the keyboard) is held down instead of the shift key.

If more than two spaces appear in a statement then this will be printed as [SPC4] or, exceptionally, [SSPC4]. Translated into English this means press the spacebar four times or in the latter case hold the shift key down while you do it.

A string of special characters could appear as:
[CTRL N, DOWN2, LEFT5, BLUE, F3, C3]

This would be achieved by holding

down the CTRL key as you press N, press the cursor key down twice, the cursor left key five times, press the key marked BLUE while holding down the CTRL key, press the F3 key and, finally hold the Commodore key down while pressing the number two key (C2 would of course make the computer print in brown).

Always remember that you should only have a row of graphics characters on your screen with no square brackets and no commas, unless something like this appears:

[SS],[C*]

In this case the two characters should have a comma between them.

On rare occasions [REV T] will appear in a listing. This is a delete symbol and is created by entering the line up to this mnemonic. Then type a closing quotation mark (SHIFT & 2) and delete it. This gets the computer out of quotes mode. Hold down CTRL and press the number nine key (RVSON), type the relevant number of reversed T's and then hold down CTRL and press zero (RVSOFF). Next type another quotation mark and delete it again. Now finish the line and press RETURN.

A list of these special cases is given in the table but remember that only one of these mnemonics will appear outside of a PRINT string: the symbol for pi. This may appear when its value is needed in a calculation so this may look something like:

:CC=2*[PI]*R:

Ignore the square brackets and just type in a shifted upward pointing arrow (ie. the pi symbol).

PROGRAM: SYNTAX CHECKER

5 REM SYNTAX CHECKER - ERIC DOYLE

10 BL=10 :LN=70 :SA=49152
20 FOR L=0 TO BL:GX=0:FOR D=0 TO 15

30 READ A:IF A>255THENPRINT"NUMB
ER TO LARGE";LN+(L*10):STOP
40 CX=CX+A:POKE SA+L*16+D,A:NEXT
D

50 READ A:IF A<CX THENPRINT"ERR
OR IN LINE";LN+(L*10):STOP
60 NEXT L:SYS 49152:NEW
70 DATA 173,5,3,201,165,208,31,1
20,169,9,141,32,208,141,33,208,1
847

80 DATA 169,7,141,134,2,169,13,3
2,210,255,169,64,141,4,3,169,168
2
90 DATA 192,141,5,3,88,96,120,16
9,124,141,4,3,169,165,141,5,1566

100 DATA 3,169,14,141,134,2,141,
32,208,169,6,141,33,208,88,96,15
85

110 DATA 32,124,165,72,138,72,15
2,72,162,0,165,20,133,254,165,21
1,1747

120 DATA 24,101,254,133,254,189,
0,2,240,18,69,254,133,254,232,18
9,2346

130 DATA 0,2,240,8,24,101,254,13
3,254,232,208,233,169,1,141,134,
2134

140 DATA 2,165,254,74,74,74,74,3
2,156,192,32,210,255,165,254,41,
2054

150 DATA 15,32,156,192,32,210,25
5,169,13,32,210,255,169,13,32,21
0,1995

160 DATA 255,169,7,141,134,2,104
168,104,170,104,96,24,105,48,20
1,1832

170 DATA 58,16,1,96,24,105,7,96,
0,0,0,0,0,0,0,403

by Eric Doyle

Checksum Program

The hexadecimal numbers appearing in a column to the left of the listing should not be typed in with the program. These are merely checksum values and are there to help you get each line right. Don't worry if you don't understand the hexadecimal system, as long as you can compare two characters on the screen with the corresponding two characters in the magazine you can use our line checking program.

Type in the Checksum Program, make sure that you've not made any mistakes and save it to tape or disk

immediately because it will be used with most of the present and future listings appearing in Your Commodore.

At the start of each programming session, load Checksum and run it. The screen will turn brown with yellow characters and each time you type in a line and press the RETURN key a number will appear on the screen in white. This should be the same as the corresponding value in the magazine.

If the two values don't relate to one another, you have not copied the line exactly as printed so go back and check each character carefully. When you find the error simply correct it and

press RETURN again.

















If you want to turn off the checker simply type SYS49152 and the screen will return to the familiar blue colours. You can then do whatever it was you wanted to do and if this doesn't use the area where Checksum lies you can go back to it with the same SYS command.

Lower Case









Many of the listings are presented in lower case. To turn your computer to lower case mode press the Commodore key and the SHIFT key at the same time.

VC

Mnemonic Symbol Keypress

[RIGHT]		CRSR left/right
[LEFT]		SHIFT & CRSR left/right
[DOWN]		CRSR up/down
[UP]		SHIFT & CRSR up/down
[F1]		f1 key
[F2]		SHIFT & f1 key
[F3]		f3 key
[F4]		SHIFT & f3 key
[F5]		f5 key
[F6]		SHIFT & f5 key
[F7]		f7 key
[F8]		SHIFT & f7 key
[HOME]		CLR/HOME
[CLR]		SHIFT & CLR/HOME
[RVSON]		CTRL & 9
[RVSOFF]		CTRL & 0

Mnemonic Symbol Keypress

[BLACK]		CTRL & 1
[WHITE]		CTRL & 2
[RED]		CTRL & 3
[CYAN]		CTRL & 4
[PURPLE]		CTRL & 5
[GREEN]		CTRL & 6
[BLUE]		CTRL & 7
[YELLOW]		CTRL & 8
[POUND]		£
[LARROW]		←
[UPARROW]		↑
[PI]		SHIFT & ↑
[INST]		SHIFT & INST/DEL
[REV T]		see text
[Cletter]		CBM + letter
[Sletter]		SHIFT + letter

YOUR COMMODORE Listings

Get The Point



PROGRAM: GET THE POINT

```

11 10 REM *****
18 20 REM *          GET THE POINT
   *
EF 30 REM * PROGRAMMED BY MARTI
   N REDDY *
B7 40 REM *****
2B 50 REM          SYS 40000 TO STA
   RT
3E 60 CLR:FORX=0TO34:FORX=0TO15
   :READA
3B 70 C=C+A:POKE39984+Y*16+X,A:
   NEXTX
DC 80 READA:IFA<>CTHENPRINT"7ER
   ROR IN LINE"100+Y*10:END
69 90 C=0:NEXTY:PRINT"O.K."
0B 100 DATA128,192,192,224,240,
   240,248,252,252,254,248,216,
   28,12,14,4,2744
CC 110 DATA76,92,157,169,45,133
   ,51,133,55,169,156,133,52,13
   3,52,162,1768
3A 120 DATA62,169,0,157,191,2,2
   02,208,250,162,0,168,189,48,
   156,153,2117
00 130 DATA192,2,232,200,200,20
   0,224,16,208,242,173,53,3,14
   1,46,208,2340
19 140 DATA169,11,141,255,7,173
   ,14,208,208,5,169,24,141,14,
   208,173,1920
04 150 DATA15,208,208,17,169,50
   ,141,15,208,173,16,208,41,12
   7,141,16,1753
BE 160 DATA208,169,0,133,2,173,
   21,208,9,128,141,21,208,96,1
   73,15,1705
1F 170 DATA208,201,246,208,1,96
   ,238,15,208,96,173,15,208,20
   1,50,208,2372
A6 180 DATA1,96,206,15,208,96,1
   65,2,201,116,48,17,173,16,20
   8,9,1577
5B 190 DATA128,141,16,208,165,2
   ,233,116,10,141,14,208,96,17
   3,16,208,1875
CE 200 DATA41,127,141,16,208,16
   5,2,10,105,24,141,14,208,96,
   165,2,1465
93 210 DATA208,1,96,198,2,76,18
   2,156,165,2,201,158,208,1,96
   ,230,1980
7D 220 DATA2,76,182,156,173,0,2
   20,201,126,208,3,76,170,156,
   201,125,2075
ES 230 DATA208,3,76,158,156,201
   ,123,208,3,76,222,156,201,11
   9,208,3,2121
44 240 DATA76,232,156,201,122,2
   08,6,32,170,156,76,222,156,2
   01,121,208,2343
FB 250 DATA6,32,158,156,76,222,
   156,201,118,208,6,32,170,156
   ,76,232,2005
BB 260 DATA156,201,117,208,6,32
   ,158,156,76,232,156,96,32,22
   8,255,201,2310
FB 270 DATA17,208,3,76,158,156,
   201,29,208,3,76,232,156,201,
   145,208,2077
69 280 DATA3,76,170,156,201,157
   ,208,3,76,222,156,96,32,67,1
   56,32,1811
FC 290 DATA244,156,32,60,157,16
   5,197,201,60,240,22,173,0,22
   0,201,112,2240
E6 300 DATA48,15,160,8,162,100,
   234,234,202,208,251,136,208,
   246,76,95,2383
AC 310 DATA157,165,2,74,74,141,
   54,3,173,15,208,233,50,74,74
   ,74,1571
84 320 DATA141,55,3,173,15,208,
   201,50,208,5,169,0,141,55,3,
   160,1587
4A 330 DATA4,173,55,3,208,5,173
   ,54,3,144,33,173,55,3,141,16
   7,1394
07 340 DATA2,10,10,10,141,56,3,
   162,5,173,167,2,10,144,1,200
   ,1096
1E 350 DATA141,167,2,202,208,24
   3,109,56,3,144,1,200,109,54,
   3,144,1786
F7 360 DATA1,200,141,168,2,140,
   169,2,173,168,2,237,169,2,10
   5,4,1683
E8 370 DATA141,168,2,173,55,3,2
   01,16,48,6,238,169,2,238,168
   ,2,1630
19 380 DATA173,168,2,208,3,238,
   168,2,201,1,208,3,238,168,2,
   201,1984
74 390 DATA2,208,3,238,168,2,20
   1,3,208,3,238,168,2,201,255,
   208,2108
91 400 DATA24,173,55,3,240,16,2
   01,16,240,12,201,8,240,8,201
   ,32,1670
5C 410 DATA240,4,169,0,240,3,23
   8,168,2,173,168,2,201,254,20
   8,13,2083
7B 420 DATA173,54,3,201,31,208,
   6,206,169,2,238,168,2,173,16
   8,2,1804
53 430 DATA141,74,158,173,169,2
   ,141,75,158,173,0,0,141,52,3
   ,173,1633
87 440 DATA21,208,41,127,141,21
   ,208,96,0,0,0,0,0,0,0,0,863

```

Through The Round Window

Getting it all in

- 1) Type in and save the program WEOS BOOT
If using cassette change the ,8,1 after the LOAD to ,1,1
- 2) Type in WEOS LOADER 1 and 2 and save them. If using tape save them on a different tape than WEOS BOOT.
If using tape remember to change the ,8,1 to ,1,1 as indicated in LOADER 2
- 3) Turn OFF and ON your machine.
- 4) Load and run WEOS LOADER 1
- 5) Load and run WEOS LOADER 2
When finished this will ask you to PRESS A KEY TO SAVE. When a key is pressed the program WEOSBASIC.CODE will be saved.
If using tape then this should be saved immediately after the program WEOS BOOT.



PROGRAM: WEOS BOOT

```

0C 100 PRINTCHR$(14)CHR$(8)CHR$(147)
91 110 PRINT"HOME,DOWN6,RIGHTS
DB 120 A=A+1:IF A=1 THEN LOAD"W
EOBASIC.CODE",8,1
04 130 SYS 64738

```

PROGRAM:WEOS LOADER 1

```

22 10 BL=234:LN=50:SA=32768
5B 20 FOR L=0 TO BL:CX=0:FOR D=
0 TO 15:READ A:CX=CX+A:POKE
SA+L*16+D,A:NEXT D
A5 30 READ A:IF A>CX THENPRINT
"ERROR IN LINE";LN+(L*10):ST
OP
40 40 NEXT L:END
E2 50 DATA 166,128,57,128,195,1
94,205,56,48,139,227,131,164
,245,130,156,2369
22 60 DATA 130,96,130,31,130,76
,72,178,0,107,143,68,128,71,
254,74,1688
F8 70 DATA 243,145,242,14,242,8
0,242,51,243,87,241,202,241,
237,246,62,2018
C3 80 DATA 241,47,243,68,128,16
5,244,237,245,32,188,246,32,
225,255,240,2036
A7 90 DATA 3,76,114,254,32,163,
253,32,24,229,32,115,128,32,
204,255,1946
16 100 DATA 169,0,133,19,32,122
,166,88,32,208,153,32,242,12
8,169,0,1693
33 110 DATA 141,32,208,141,33,2
08,169,5,141,134,2,32,254,12
8,162,128,1918
61 120 DATA 76,136,227,162,21,1
60,128,134,195,132,196,160,3
5,177,195,153,2287
1E 130 DATA 16,3,136,16,248,169
,72,160,235,141,143,2,140,14
4,2,96,1723
5A 140 DATA 170,169,13,32,210,2
55,138,10,170,189,192,140,16
8,189,191,140,2376
EB 150 DATA 32,30,171,76,98,164
,142,22,208,32,163,253,32,80
,253,32,1788
91 160 DATA 91,255,32,115,128,8
8,32,242,128,32,191,227,32,9
4,153,169,2009
41 170 DATA 128,133,52,133,56,1
33,54,169,1,133,43,169,4,133
,44,169,1554
02 180 DATA 0,141,0,4,133,51,13
3,53,133,55,141,32,208,141,3
3,208,1466
0A 190 DATA 169,5,141,134,2,169

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,2,160,155,32,45,228,162,251
,154,76,1885
1C 200 DATA 107,128,162,11,189,
9,128,157,0,3,202,16,247,96,
162,120,1737
F3 210 DATA 169,0,157,100,148,2
02,208,250,96,82,85,206,67,7
6,211,67,2124
A2 220 DATA 85,82,83,79,210,67,
79,76,79,85,210,80,79,73,78,
84,1529
A7 230 DATA 69,210,79,76,196,77
,69,78,213,83,79,80,69,206,8
3,67,1734
FC 240 DATA 76,79,83,197,87,79,
80,69,206,87,67,76,79,83,197
,87,1632
D7 250 DATA 83,87,65,208,87,67,
79,80,217,87,77,79,86,197,68
,69,1636
3E 260 DATA 83,203,87,80,82,73,
78,212,87,69,79,211,79,70,19
8,68,1759
96 270 DATA 73,83,203,68,73,210
,80,65,85,83,197,73,78,86,69
,82,1608
CE 280 DATA 83,197,77,79,86,66,
76,203,87,73,78,68,79,215,77
,79,1623
25 290 DATA 85,83,197,84,89,80,
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,82,1651
56 300 DATA 206,67,72,69,67,203
,67,80,79,211,0,63,66,65,68,
32,1415
8D 310 DATA 87,73,78,68,79,87,3
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05 320 DATA 78,68,79,87,83,32,7
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54 330 DATA 77,69,78,85,32,83,8
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4C 340 DATA 32,87,73,78,68,79,8
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E3 350 DATA 84,32,68,69,70,73,7
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32 360 DATA 79,87,32,79,80,69,7
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1D 370 DATA 65,78,89,32,87,73,7
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1120
39 380 DATA 68,79,87,32,78,79,8
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,1150
65 390 DATA 0,133,13,32,115,0,2
01,238,240,6,32,121,0,76,141
,174,1522
78 400 DATA 230,122,208,2,230,1
23,160,0,177,122,201,7,208,2
,169,31,1992
64 410 DATA 201,24,176,3,76,8,1
75,133,36,169,173,72,169,140
,72,198,1825
D2 420 DATA 36,165,36,10,170,18
9,128,140,72,189,127,140,72,
76,115,0,1665
A2 430 DATA 32,115,0,32,105,130
,76,174,167,201,238,208,33,2
30,122,208,2071
59 440 DATA 2,230,123,160,0,177
,122,201,24,144,3,76,8,175,5
6,233,1734
A4 450 DATA 1,10,168,185,128,14
0,72,185,127,140,72,76,115,0
,201,139,1759
29 460 DATA 208,4,169,32,208,23

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6,243,1856
7B 470 DATA 166,201,255,240,249
,36,15,48,245,201,238,240,5,
32,215,130,2516
86 480 DATA 48,3,32,184,130,76,
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3,160,255,2140
05 490 DATA 202,240,8,200,185,9
,129,16,250,48,245,200,185,9
,129,48,2103
C1 500 DATA 5,32,210,255,208,24
5,96,56,233,127,170,132,73,1
60,255,202,2459
C2 510 DATA 240,8,200,185,158,1
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,160,48,230,2491
44 520 DATA 32,210,255,208,245,
166,122,160,4,132,15,189,0,2
,16,7,1763
AD 530 DATA 201,255,240,43,232,
208,244,201,32,240,36,133,8,
201,34,240,2548
89 540 DATA 71,36,15,112,26,201
,63,208,4,169,153,208,18,201
,48,144,1677
BC 550 DATA 4,201,60,144,10,76,
114,131,169,238,44,5,11,164,
113,232,1716
FB 560 DATA 200,153,251,1,201,2
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CE 570 DATA 240,4,201,73,208,2,
133,15,56,233,85,208,174,133
,8,189,1962
33 580 DATA 0,2,240,219,197,8,2
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B1 590 DATA 253,1,198,123,169,2
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,251,1,76,2207
2C 600 DATA 251,130,132,113,160
,255,134,122,202,169,1,133,1
1,200,232,189,2434
73 610 DATA 0,2,56,249,9,129,24
0,245,201,128,240,156,166,12
2,230,11,2184
8B 620 DATA 200,185,8,129,16,25
0,185,9,129,208,228,160,0,13
2,11,136,1986
A6 630 DATA 166,122,202,200,232
,189,0,2,56,249,158,160,240,
245,201,128,2550
1C 640 DATA 208,3,76,43,131,166
,122,230,11,200,185,157,160,
16,250,185,2143
C2 650 DATA 158,160,208,225,189
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,158,183,2026
7D 660 DATA 224,16,176,1,96,162
,14,76,55,164,133,99,132,98,
169,0,1615
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6,247,183,1841
58 680 DATA 32,253,174,32,158,1
73,76,166,182,32,253,174,76,
158,183,173,2295
EA 690 DATA 134,2,141,110,148,1
41,111,148,169,0,141,121,148
,32,121,0,1667
54 700 DATA 201,44,240,1,96,32,
115,0,201,44,240,6,32,205,13
1,142,1730
85 710 DATA 110,148,32,121,0,20
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,2,176,1807
7C 720 DATA 18,142,121,148,32,1
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41 730 DATA 111,148,96,76,182,1

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33, 173, 104, 148, 240, 6, 201, 6, 240, 4, 24, 1892		, 131, 224, 25, 176, 31, 24, 138, 24, 109, 108, 148, 1826		4, 104, 148, 240, 48, 56, 32, 19, 149, 142, 105, 148, 2013
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E6 860 DATA 128, 174, 167, 2, 240, 14, 224, 9, 176, 221, 32, 60, 147, 144, 5, 169, 1912	A0	1130 DATA 174, 2, 10, 201, 21, 176, 177, 32, 240, 131, 201, 0, 240, 170, 141, 170, 2086	EC	1400 DATA 32, 213, 243, 165, 186, 32, 55, 242, 144, 3, 76, 249, 224, 162, 6, 165, 2197
SC 870 DATA 4, 76, 144, 128, 96, 173, 104, 148, 201, 6, 240, 1, 96, 32, 48, 143, 1640	62	1140 DATA 2, 165, 34, 141, 171, 2, 165, 35, 141, 172, 2, 173, 134, 2, 141, 173, 1653	9B	1410 DATA 98, 133, 99, 32, 18, 225, 133, 98, 165, 144, 208, 41, 202, 208, 240, 169, 2213
4D 880 DATA 174, 105, 148, 189, 0, 204, 201, 32, 240, 10, 41, 127, 157, 0, 204, 232, 2064	36	1150 DATA 2, 141, 110, 148, 141, 111, 148, 169, 0, 141, 121, 148, 32, 121, 0, 201, 1734	65	1420 DATA 39, 32, 12, 225, 32, 209, 189, 169, 32, 32, 12, 225, 32, 18, 225, 170, 1653
AC 890 DATA 224, 40, 144, 239, 169, 1, 76, 190, 144, 173, 104, 148, 201, 5, 208, 5, 2071	D4	1160 DATA 44, 208, 9, 32, 202, 131, 142, 173, 2, 32, 255, 131, 174, 167, 2, 202, 1906	D8	1430 DATA 240, 5, 32, 12, 225, 144, 245, 169, 13, 32, 12, 225, 32, 225, 240, 2106
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DA 980 DATA 201, 5, 208, 3, 76, 60, 134, 201, 4, 144, 5, 169, 7, 76, 144, 128, 1565	44	1250 DATA 32, 249, 131, 142, 168, 2, 236, 106, 148, 176, 242, 162, 132, 121, 0, 1948	28	1520 DATA 240, 6, 32, 62, 137, 76, 47, 137, 32, 115, 0, 76, 226, 136, 142, 132, 1596
EF 990 DATA 32, 230, 133, 76, 74, 145, 32, 48, 143, 32, 158, 183, 224, 40, 176, 41, 1767	23	1260 DATA 201, 44, 208, 3, 32, 249, 131, 142, 169, 2, 138, 24, 109, 167, 2, 205, 1826	A2	1530 DATA 148, 76, 219, 150, 76, 8, 175, 32, 158, 183, 224, 3, 144, 3, 76, 213, 1888
7C 1000 DATA 142, 117, 148, 32, 249	9C	1270 DATA 107, 148, 176, 217, 17	FS	1540 DATA 131, 142, 110, 148, 32

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4B	1550 DATA 5,138,153,32,208,9 6,142,134,2,96,32,234,131,16 5,20,5,1593	C3	1820 DATA 201,24,76,240,255, 76,213,131,76,213,131,32,155 ,183,201,44,2251	FF	2090 DATA 129,173,129,191,12 9,204,129,216,129,234,129,23 5,129,250,129,12,2547
45	1560 DATA 21,208,6,32,228,25 5,240,251,96,162,0,160,0,202 ,208,253,2322	DF	1830 DATA 240,3,76,8,175,134 ,201,224,40,176,237,32,249,1 31,134,202,2262	85	2100 DATA 130,0,0,0,0,0,0, 0,0,0,165,1,41,252,120,709
7E	1570 DATA 136,208,250,165,20 ,240,4,198,20,208,242,165,21 ,240,4,198,2319	52	1840 DATA 224,25,176,228,32, 247,174,32,70,132,176,51,165 ,201,170,205,2308	49	2110 DATA 133,1,96,165,1,9,3 ,133,1,88,96,165,14,24,101,2 ,1032
06	1580 DATA 21,208,234,96,169, 147,133,9,32,70,132,165,9,17 6,3,76,1680	47	1850 DATA 123,148,176,212,16 5,202,168,205,124,148,176,20 4,173,102,148,133,2607	70	2120 DATA 133,14,144,2,230,1 5,24,165,2,101,16,133,16,144 ,2,230,1371
2D	1590 DATA 239,149,76,210,255 ,32,166,179,32,158,183,76,20 4,146,32,121,2258	10	1860 DATA 201,173,103,148,13 3,202,32,19,149,172,102,148, 177,251,133,190,2333	07	2130 DATA 17,165,2,24,101,6, 133,6,144,2,230,7,24,165,8,1 01,1135
8E	1600 DATA 0,201,238,208,18,3 2,115,0,201,18,208,11,173,21 ,208,41,1693	CE	1870 DATA 177,253,133,183,16 6,201,164,202,24,32,19,149,7 6,145,139,56,2119	87	2140 DATA 2,133,8,144,2,230, 9,24,165,10,101,2,133,10,144 ,2,1119
A3	1610 DATA 254,141,21,208,76, 115,0,201,145,208,11,173,21, 208,9,1,1792	8E	1880 DATA 32,240,255,142,12, 3,140,13,3,166,202,164,201,2 4,32,240,1869	74	2150 DATA 230,11,165,12,24,1 01,2,133,12,144,2,230,13,96, 169,0,1344
3F	1620 DATA 141,21,208,76,115, 0,32,158,183,142,248,207,32, 253,174,32,2022	7F	1890 DATA 255,164,211,177,20 9,133,190,174,12,3,172,13,3, 24,32,240,2012	60	2160 DATA 133,10,133,12,169, 204,133,11,169,216,133,13,16 9,40,133,2,1680
DA	1630 DATA 205,131,142,39,208 ,32,242,137,142,98,148,32,24 2,137,142,99,2176	6A	1900 DATA 255,165,190,160,0, 76,218,131,173,114,148,160,0 ,76,218,131,2215	A0	2170 DATA 174,118,148,240,6, 32,23,141,202,208,250,173,11 7,148,133,2,2115
AS	1640 DATA 148,96,32,121,0,20 1,44,208,8,32,249,131,224,9, 176,4,1683	72	1910 DATA 32,155,183,201,41, 240,3,76,8,175,224,2,176,26, 160,0,1702	2F	2180 DATA 32,23,141,96,32,46 ,141,169,0,133,6,133,8,174,1 04,148,1386
49	1650 DATA 44,162,2,96,76,213 ,131,32,155,183,201,41,240,3 ,76,8,1663	1E	1920 DATA 189,134,148,32,218 ,131,76,247,174,0,32,166,179 ,32,158,183,2099	BA	2190 DATA 224,5,176,22,174,1 04,148,202,138,10,10,72,24,1 05,160,133,1707
8B	1660 DATA 175,224,6,144,3,76 ,213,131,142,129,148,32,247, 174,173,104,2121	DC	1930 DATA 224,0,240,4,224,3, 144,3,76,213,131,76,84,151,3 2,250,1855	12	2200 DATA 7,104,24,105,176,1 33,9,76,130,141,169,240,133, 7,169,244,1867
73	1670 DATA 148,208,11,174,129 ,148,208,36,169,0,168,76,218 ,131,32,48,1904	84	1940 DATA 174,32,158,173,32, 166,182,133,165,166,34,134,1 95,166,35,134,2079	0C	2210 DATA 133,9,76,183,141,3 2,48,143,174,107,148,202,202 ,142,123,148,2011
AC	1680 DATA 143,174,129,148,18 9,104,148,160,0,76,218,131,2 01,40,240,39,2140	D1	1950 DATA 196,32,249,131,138 ,166,165,240,10,160,0,209,19 5,240,13,200,2344	AC	2220 DATA 174,108,148,202,20 2,142,124,148,165,10,24,105, 41,141,125,148,2007
93	1690 DATA 160,0,173,0,220,41 ,15,73,15,76,218,131,162,0,1 34,12,1430	EB	1960 DATA 202,208,248,138,16 0,0,32,218,131,76,247,174,20 0,152,208,244,2638	C3	2230 DATA 165,11,105,0,141,1 26,148,165,12,24,105,41,141, 127,148,165,1624
41	1700 DATA 134,13,162,129,134 ,97,202,134,98,169,0,133,99, 133,100,133,1870	FA	1970 DATA 32,158,183,134,193 ,162,0,134,194,162,6,6,193,3 8,194,202,1991	F9	2240 DATA 13,105,0,141,128,1 48,96,174,104,148,202,138,10 ,10,10,10,1437
EB	1710 DATA 101,169,255,133,10 2,96,1,32,250,174,169,0,141, 102,138,32,1895	0B	1980 DATA 208,249,165,193,24 ,105,97,133,193,165,194,105, 155,133,194,32,2345	2E	2250 DATA 168,162,0,173,121, 148,74,106,13,117,148,141,11 7,148,189,117,1942
85	1720 DATA 121,0,201,35,208,6 ,238,102,138,32,115,0,32,158 ,183,224,1793	EE	1990 DATA 249,131,134,195,16 2,0,134,196,162,6,6,195,38,1 96,202,208,2214	EA	2260 DATA 148,153,128,158,20 0,232,224,4,144,244,162,0,18 1,6,153,128,2265
ED	1730 DATA 5,144,3,76,213,131 ,142,131,148,32,247,174,174, 131,148,173,2072	F1	2000 DATA 249,165,196,24,105 ,192,133,196,160,0,177,193,1 45,195,200,192,2522	D9	2270 DATA 158,232,200,224,8, 144,245,96,160,0,177,12,153, 60,3,200,2072
93	1740 DATA 102,138,240,48,224 ,2,176,235,173,104,148,240,3 9,142,102,138,2251	3A	2010 DATA 63,144,247,96,32,1 58,173,32,121,0,201,167,208, 3,32,115,1792	6D	2280 DATA 204,119,148,144,24 5,177,12,153,60,3,32,219,140 ,160,0,177,1993
3D	1750 DATA 32,48,143,174,102, 138,254,105,148,189,107,148, 56,233,2,157,2036	69	2020 DATA 0,165,97,208,5,32, 9,169,240,6,32,121,0,76,105, 130,1395	04	2290 DATA 10,145,6,169,32,14 5,10,185,60,3,145,8,200,204, 119,148,1589
04	1760 DATA 107,148,189,112,14 8,48,149,56,253,105,148,144, 143,221,107,148,2226	A0	2030 DATA 76,251,168,32,155, 183,201,41,240,3,76,8,175,32 ,115,0,1756	5E	2300 DATA 144,237,177,10,145 ,6,185,60,3,145,8,76,227,140 ,32,84,1679
9B	1770 DATA 176,138,144,25,224 ,2,176,7,189,112,148,48,133, 16,14,224,1776	33	2040 DATA 224,2,144,3,76,213 ,131,189,102,148,160,0,76,21 8,131,216,2033	03	2310 DATA 141,169,40,133,2,1 74,120,148,32,232,141,160,0, 173,210,140,2015
D2	1780 DATA 4,176,7,202,202,18 9,98,148,16,3,173,39,208,160 ,0,76,1701	97	2050 DATA 132,147,137,225,13 8,70,137,173,137,186,136,99, 134,72,133,186,2242	23	2320 DATA 145,10,173,110,148 ,145,12,200,173,211,140,145, 10,173,110,148,2053
0D	1790 DATA 218,131,32,158,183 ,134,201,224,40,176,42,32,24 9,131,134,202,2287	39	2060 DATA 133,90,132,225,132 ,27,134,199,133,47,134,164,1 37,209,136,185,2217	22	2330 DATA 145,12,200,204,119 ,148,144,240,173,212,140,136 ,145,10,173,110,2311
05	1800 DATA 224,25,176,33,32,7 0,132,176,20,165,201,170,205 ,123,148,176,2076	29	2070 DATA 139,87,132,11,136, 89,136,105,137,63,135,255,13 9,6,138,59,1767	CD	2340 DATA 148,145,12,202,32, 1,141,32,232,141,160,0,173,2 13,140,145,1917
3B	1810 DATA 20,165,202,168,205	86	2080 DATA 138,159,139,151,13	AC	2350 DATA 10,173,110,148,145 ,12,172,119,148,136,145,12,1


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73,214,140,145,2002
80 2360 DATA 10,173,121,148,240
,10,200,169,160,145,10,173,1
11,148,145,12,1975
49 2370 DATA 202,208,209,160,0,
173,215,140,145,10,173,110,1
48,145,12,200,2250
32 2380 DATA 173,216,140,145,10
,173,110,148,145,12,200,204,
119,148,144,240,2327
AD 2390 DATA 136,173,217,140,14
5,10,173,110,148,145,12,174,
121,148,0,0,1852

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PROGRAM: WEOS LOADER 2

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21 10 BL=234:LN=50:SA=36512
5B 20 FOR L=0 TO BL:CX=0:FOR D=
0 TO 15:READ A:CX=CX+A:POKE
SA+L*16+D,A:NEXT D
AS 30 READ A:IF A>CX THENPRINT
"ERROR IN LINE";LN+(L*10):ST
OP
86 40 NEXT L
E4 50 DATA 136,173,217,140,145,
10,173,110,148,145,12,174,12
1,148,240,25,2117
C1 60 DATA 230,2,32,1,141,32,23
2,141,160,0,169,160,145,10,1
73,111,1739
6E 70 DATA 148,145,12,200,204,1
19,148,144,241,96,32,48,143,
76,245,142,2143
45 80 DATA 32,219,140,160,0,177
,6,145,10,177,8,153,60,3,200
,204,1694
2A 90 DATA 107,148,144,241,32,2
27,140,160,0,185,60,3,145,12
,200,204,2008
1F 100 DATA 107,148,144,245,96,
169,40,133,2,174,108,148,32,
208,142,202,2098
6B 110 DATA 32,1,141,24,173,107
,148,109,109,148,141,107,148,
,32,208,142,1770
F7 120 DATA 32,1,141,202,208,24
7,173,109,148,240,20,162,0,2
46,6,208,2143
FC 130 DATA 2,246,7,232,232,224
,8,144,244,206,107,148,76,20
8,142,96,2322
0D 140 DATA 174,104,148,202,138
,10,10,10,10,168,162,0,185,1
28,158,157,1764
1B 150 DATA 105,148,232,200,224
,4,144,244,162,0,185,128,158
,149,6,232,2321
37 160 DATA 200,224,8,144,245,1
73,105,148,16,3,169,1,44,169
,0,141,1790
AF 170 DATA 109,148,173,105,148
,41,127,141,105,148,96,173,0
,220,74,176,1984
59 180 DATA 12,72,173,1,208,56,
237,99,148,141,1,208,104,74,
176,12,1722
F7 190 DATA 72,173,1,208,24,109
,99,148,141,1,208,104,74,176
,22,72,1632
8B 200 DATA 56,173,0,208,237,98
,148,141,0,208,176,8,173,16,
208,73,1923
9A 210 DATA 1,141,16,208,104,74
,176,22,72,173,0,208,24,109,
98,148,1574
BF 220 DATA 141,0,208,144,8,173
,16,208,73,1,141,16,208,104,

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74,176,1691
F5 230 DATA 3,169,1,44,169,0,14
1,114,148,173,1,208,56,233,5
0,144,1654
1C 240 DATA 65,74,74,74,141,113
,148,169,0,141,122,148,173,1
6,208,74,1740
09 250 DATA 46,122,148,173,0,20
8,56,233,24,176,7,72,78,122,
148,104,1717
12 260 DATA 144,32,141,112,148,
78,122,148,110,112,148,78,11
2,148,78,112,1823
F7 270 DATA 148,173,112,148,201
,40,176,10,173,113,148,201,2
5,176,3,76,1923
FB 280 DATA 49,234,169,255,141,
112,148,141,113,148,76,49,23
4,32,202,142,2245
32 290 DATA 173,116,148,141,104
,148,240,9,32,133,141,32,126
,150,32,59,1784
D4 300 DATA 148,96,32,202,142,2
06,104,148,240,247,208,236,1
73,104,148,240,2674
23 310 DATA 3,32,39,148,238,104
,148,162,97,32,85,148,32,30,
142,173,1613
FC 320 DATA 136,148,133,34,173,
137,148,133,35,173,138,148,2
40,44,32,48,1900
D0 330 DATA 143,173,138,148,74,
133,2,173,107,148,74,56,229,
2,168,162,1930
AB 340 DATA 0,162,0,140,116,148
,138,168,177,34,41,63,9,128,
172,116,1612
10 350 DATA 148,145,10,200,232,
236,138,148,144,233,32,133,1
41,32,126,150,2248
45 360 DATA 76,59,148,173,104,1
48,141,116,148,240,6,32,48,1
43,32,39,1653
17 370 DATA 148,169,5,141,104,1
48,162,105,32,85,148,32,30,1
42,32,133,1616
9D 380 DATA 141,76,126,150,201,
0,208,3,76,60,144,76,147,144
,201,0,1753
22 390 DATA 208,3,76,50,144,76,
29,144,169,40,133,2,174,108,
148,32,1536
45 400 DATA 3,145,173,107,148,2
4,109,109,148,141,107,148,32
,235,140,202,1971
49 410 DATA 32,3,145,32,235,140
,202,208,247,173,109,148,240
,20,162,0,2096
AC 420 DATA 246,6,208,2,246,7,2
32,232,224,12,144,244,206,10
7,148,76,2340
35 430 DATA 3,145,96,160,0,177,
12,153,60,3,200,204,107,148,
144,245,1857
78 440 DATA 32,219,140,160,0,18
5,60,3,145,16,177,10,145,14,
173,185,1664
F3 450 DATA 139,208,9,177,6,145
,10,177,8,153,60,3,200,204,1
07,148,1754
59 460 DATA 144,227,32,227,140,
173,185,139,208,200,160,0,18
5,60,3,145,2228
77 470 DATA 12,200,204,107,148,
144,245,96,24,36,56,169,0,42
,141,185,1809
C4 480 DATA 139,173,102,148,72,
173,103,148,72,32,48,143,32,
39,148,169,1741
89 490 DATA 0,133,14,133,16,169
,240,133,15,169,244,133,17,3

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2,200,144,1792
D0 500 DATA 173,185,139,240,3,2
38,104,148,173,107,148,141,1
19,148,173,108,2347
07 510 DATA 148,141,120,148,173
,109,148,141,121,148,32,84,1
41,165,6,133,1958
96 520 DATA 14,165,7,133,15,165
,8,133,16,165,9,133,17,169,0
,133,1282
B1 530 DATA 6,133,8,169,240,133
,7,169,244,133,9,169,0,141,1
85,139,1885
29 540 DATA 32,200,144,32,48,14
3,32,59,148,32,133,141,104,1
68,104,170,1690
90 550 DATA 24,76,19,149,32,48,
143,169,0,133,14,133,16,169,
240,133,1498
BB 560 DATA 15,169,244,133,17,1
69,0,141,185,139,32,39,148,3
2,200,144,1807
19 570 DATA 206,104,148,32,48,1
43,169,0,133,14,133,16,169,2
48,133,15,1711
FD 580 DATA 169,252,133,17,32,2
00,144,174,104,148,202,138,1
0,10,10,10,1753
7B 590 DATA 170,160,0,189,128,1
58,153,167,2,200,232,192,16,
144,244,238,2393
A7 600 DATA 104,148,32,48,143,1
65,7,56,233,4,133,7,133,15,1
65,9,1402
F5 610 DATA 56,233,4,133,9,133,
17,206,104,148,162,0,189,105
,148,157,1804
4E 620 DATA 117,148,232,224,5,1
44,245,32,183,141,165,6,133,
14,165,8,1962
7B 630 DATA 133,16,169,240,133,
7,169,244,133,9,169,0,133,6,
133,8,1702
C7 640 DATA 32,200,144,238,104,
148,174,104,148,202,138,10,1
0,10,10,170,1842
33 650 DATA 173,172,2,24,105,4,
141,172,2,173,174,2,24,105,4
,141,1418
E7 660 DATA 174,2,160,0,185,167
,2,157,128,158,232,200,192,1
6,144,244,2161
F0 670 DATA 32,48,143,165,6,133
,14,165,7,133,15,165,8,133,1
6,165,1348
B5 680 DATA 9,133,17,169,0,133,
6,133,8,169,248,133,7,169,25
2,133,1719
4A 690 DATA 9,32,200,144,32,133
,141,32,59,148,76,126,150,14
2,185,139,1748
3C 700 DATA 138,10,170,189,163,
148,29,164,148,208,2,56,96,1
89,163,148,2021
FE 710 DATA 133,34,189,164,148,
133,35,174,185,139,24,96,169
,0,141,104,1868
EB 720 DATA 148,169,147,32,210,
255,160,40,132,34,160,204,13
2,35,138,162,2158
B4 730 DATA 3,160,0,145,34,200,
208,251,230,35,202,208,246,1
45,34,160,2261
E0 740 DATA 191,145,34,136,208,
251,162,0,142,211,148,32,173
,146,144,12,2135
B2 750 DATA 56,32,240,255,162,1
,160,0,24,76,240,255,189,195
,148,170,2203
S0 760 DATA 160,0,177,34,240,15
,201,95,240,11,201,94,240,7,

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LISTINGS

	32,210,1957		3,191,150,177,150,205,150,21		1,102,148,141,103,148,141,11
A6	770 DATA 255,200,202,208,237	42	9,150,40,151,120,2624	F8	5,148,76,156,1838
	,169,32,32,210,255,56,32,240		1070 DATA 150,31,63,95,159,1		1340 DATA 149,173,102,148,72
CB	,255,174,185,2742		91,223,96,64,96,64,0,32,255,		,32,91,150,104,141,102,148,7
	780 DATA 139,152,232,157,211	25	224,192,1935	22	6,156,149,173,1966
	,148,224,8,208,193,240,196,1		1080 DATA 160,96,64,144,7,17		1350 DATA 102,148,72,32,234,
AB	42,100,148,202,2700		4,102,148,172,103,148,96,236		150,104,141,102,148,76,156,1
	790 DATA 32,173,146,144,1,96	22	,123,148,144,2065	68	49,173,102,148,2037
	,189,147,148,141,119,148,189		1090 DATA 2,162,0,204,124,14		1360 DATA 240,3,206,102,148,
F9	,203,148,141,2165		8,144,2,160,0,142,102,148,14		76,156,149,76,120,150,174,10
	800 DATA 120,148,133,97,189,	0C	0,103,148,1729	D4	2,148,232,236,2318
	139,148,133,98,240,3,14,120,		1100 DATA 32,69,149,174,103,		1370 DATA 123,148,176,244,23
EB	148,189,179,2098		148,240,6,32,82,149,202,208,		8,102,148,76,156,149,169,0,1
	810 DATA 148,141,111,148,189	C0	250,174,102,2120	E1	41,102,148,173,2293
	,187,148,141,110,148,189,219		1110 DATA 148,172,103,148,96		1380 DATA 103,148,240,8,32,1
70	,148,141,121,148,2437		,162,0,189,125,148,149,251,2		05,149,206,103,148,24,96,56,
	820 DATA 238,120,148,238,120	5A	32,224,4,144,2295	AD	96,133,195,1842
	,148,189,211,148,141,117,148		1120 DATA 246,96,165,253,24,		1390 DATA 132,196,160,0,177,
78	,160,1,140,118,2385		105,40,133,253,144,2,230,254		195,240,12,32,239,149,230,19
	830 DATA 148,24,109,119,148,	0F	,165,251,24,2385	60	5,208,245,230,2640
	109,121,148,201,40,144,2,56,		1130 DATA 105,40,133,251,144		1400 DATA 196,76,4,151,96,32
21	96,172,117,1754		,2,230,252,96,165,253,56,233		,166,182,160,0,170,232,202,2
	840 DATA 148,185,0,204,201,3	BF	,40,133,253,2386	91	40,8,177,2092
	2,240,10,9,128,153,0,204,200		1140 DATA 176,2,198,254,165,		1410 DATA 34,32,239,149,200,
69	,192,40,1946		251,56,233,40,133,251,176,2,		208,245,96,172,102,148,169,3
	850 DATA 144,239,173,104,148	A3	198,252,96,2483	06	2,145,251,173,2395
	,141,116,148,240,6,32,48,143		1150 DATA 160,0,169,32,145,2		1420 DATA 134,2,145,253,136,
9F	,32,39,148,1901		51,173,134,2,145,253,200,204		48,6,140,102,148,76,156,149,
	860 DATA 169,6,141,104,148,1	99	,123,148,144,2283	D0	32,234,150,1911
	62,113,32,85,148,32,30,142,3		1160 DATA 241,96,141,131,148		1430 DATA 176,10,174,123,148
89	2,48,143,1535		,142,132,148,140,133,148,96,		,202,142,102,148,76,156,149,
	870 DATA 32,133,141,32,126,1	29	173,131,148,174,2322	54	169,0,141,102,2018
	50,174,100,148,202,173,134,2		1170 DATA 132,148,172,133,14		1440 DATA 148,76,156,149,142
A2	,133,102,189,1971		8,96,32,69,149,32,82,149,162		,131,148,169,0,133,193,169,2
	880 DATA 155,148,141,134,2,1	4D	,1,32,201,1738	25	04,133,194,169,2314
	38,10,170,189,163,148,133,34		1180 DATA 149,32,105,149,32,		1450 DATA 0,141,134,148,141,
78	,189,164,148,2066	FA	220,149,32,82,149,32,82,149,	12	135,148,141,100,148,141,101,
	890 DATA 133,35,169,255,133,		232,236,124,1954		148,173,114,148,2061
	99,160,0,177,34,201,95,240,3		1190 DATA 148,144,235,32,105		1460 DATA 208,1,96,173,112,1
F8	0,201,94,2056		,149,76,128,149,160,0,177,25	4F	48,16,1,96,141,132,148,174,1
	900 DATA 240,14,201,0,240,10	0E	1,153,0,158,2065		13,148,16,1723
20	,166,99,48,3,32,239,149,200,		1200 DATA 177,253,153,40,158		1470 DATA 1,96,142,133,148,2
	208,232,2081	64	,200,204,123,148,144,240,96,	AD	32,202,240,14,24,165,193,105
	910 DATA 169,0,141,101,148,1		160,0,185,0,2281		,40,133,193,2061
87	65,102,141,134,2,24,96,230,9	BD	1210 DATA 158,145,251,185,40		1480 DATA 144,2,230,194,202,
	9,165,99,1816		,158,145,253,200,204,123,148		208,242,172,132,148,177,193,
	920 DATA 197,97,240,236,166,		,144,240,96,32,2522	DB	201,121,240,46,2652
	98,240,1,10,132,100,168,162,		1220 DATA 146,149,201,0,240,		1490 DATA 201,122,240,41,201
9D	0,24,32,1903	D1	,248,201,255,208,4,169,94,208	0A	,123,240,49,201,124,240,44,1
	930 DATA 19,149,164,100,76,2		,28,41,127,2319		62,0,221,233,2442
D9	53,147,160,1,169,98,145,10,2	BA	1230 DATA 201,32,144,50,162,	7E	1500 DATA 152,240,8,232,224,
	00,145,10,1846		5,173,131,148,221,13,149,144		5,144,246,76,240,151,232,232
	940 DATA 172,107,148,136,136	9E	,3,202,16,1794		,232,142,135,2691
5C	,145,10,136,145,10,96,160,1,		1240 DATA 245,189,1,149,45,1		1510 DATA 148,169,1,141,134,
	169,121,145,1837		31,148,29,7,149,172,102,148,	97	148,177,193,73,128,145,193,9
	950 DATA 10,200,169,122,145,		13,115,148,1791		6,136,169,1,2052
62	10,172,107,148,136,136,169,1	4D	1250 DATA 145,251,173,134,2,		1520 DATA 141,135,148,141,13
	24,145,10,136,1939		145,253,200,204,123,148,176,	68	4,148,208,10,136,162,1,142,1
	960 DATA 169,123,145,10,96,1		6,140,102,148,2350		34,148,232,142,2162
1E	60,1,138,153,209,140,200,232	58	1260 DATA 76,156,149,76,91,1		1530 DATA 135,148,177,193,9,
	,192,9,144,2121		50,173,131,148,162,9,221,227		128,145,193,200,177,193,9,12
0A	970 DATA 246,96,2,2,0,0,0,0,		,148,240,9,2166	75	8,145,193,96,2269
	0,0,0,0,0,0,0,0,0,346	6D	1270 DATA 202,16,248,32,210,		1540 DATA 173,131,148,201,1,
72	980 DATA 255,255,0,0,0,0,0,0,		255,76,156,149,138,10,170,18	30	208,1,96,174,133,148,240,1,9
	,0,0,0,0,0,0,0,0,510		9,237,148,141,2377		6,32,238,2021
78	990 DATA 0,0,0,0,0,0,0,0,0,0	E2	1280 DATA 129,148,189,238,14		1550 DATA 152,144,1,96,142,1
	,0,0,0,0,0,0,0,0,0,0		8,141,130,148,108,129,148,16	52	00,148,142,135,148,162,2,142
66	1000 DATA 0,0,0,0,0,0,0,0,0,0		9,0,141,102,148,2216		,134,148,174,1970
	,0,0,0,0,0,0,0,0,0,0		1290 DATA 174,103,148,232,23		1560 DATA 100,148,32,60,147,
6C	1010 DATA 0,0,0,0,0,0,0,0,0,0	3D	6,124,148,176,9,32,82,149,23		32,48,143,238,105,148,238,10
	,0,0,0,0,0,0,0,0,0,0		8,103,148,76,2178	B7	6,148,206,107,2006
59	1020 DATA 0,0,0,0,0,0,0,0,0,0	1A	1300 DATA 156,149,32,166,149		1570 DATA 148,206,108,148,20
	,0,0,0,0,0,0,0,0,0,0		,76,156,149,32,91,150,76,156		6,108,148,32,80,153,173,114,
47	1030 DATA 0,0,0,0,0,0,0,0,0,0		,149,32,69,1788	53	148,240,248,174,2434
	,0,0,0,0,0,0,0,0,0,0		1310 DATA 149,169,0,141,102,		1580 DATA 105,148,48,243,142
A1	1040 DATA 0,0,0,0,0,0,0,0,0,0	38	148,141,103,148,141,115,148,	2F	,132,148,173,113,148,48,235,
	,0,0,0,0,0,0,0,0,0,0		76,156,149,32,1918		141,133,148,208,2313
CB	1050 DATA 0,0,0,147,19,18,14	EE	1320 DATA 69,149,162,0,32,12		1590 DATA 3,76,25,153,205,10
	6,145,17,157,29,20,13,143,15		8,149,32,82,149,232,236,124,	1C	6,148,144,222,236,105,148,14
	0,126,1130		148,144,244,2080		4,217,237,106,2275
	1060 DATA 150,234,153,231,15		1330 DATA 32,69,149,169,0,14		1600 DATA 148,205,108,148,17

11
 72
 8,7
 34,
 6,1
 48,
 10
 23
 0,1
 2,1
 56,
 77,
 19
 32
 2,2
 200,
 9,3
 36,
 49,
 148
 49,
 142
 9,2
 41,
 01,
 2,1
 4,1
 8,2
 105
 02,
 93,
 201
 4,1
 24,
 232
 34,
 3,9
 13
 2,1
 3,9,
 12
 1,
 1,9
 2,1
 142
 47,
 3,10
 3,20
 14,
 142
 235,
 5,10
 3,14
 3,17

Ultra Function Keys



PROGRAM: UFK LOADER

```

FF 40 FL=100:LL=2390:IN=10:AD=4
9152
E4 50 FORA=0TO(LL-FL)/IN
4D 60 FORB=1TO16:READDI:POKEAD,
DI:AD=AD+1:CH=CH+DI:NEXT
20 70 READCK:IFCK=CHTHENCH=0:PR
INT"LINE";FL+A*IN;"IS OK":NE
XT:GOTO90
F3 80 PRINT"[DOWN]EVERYTHING IN LIN
E";FL+A*IN:END
1A 90 FORI=52830TO53105:POKEI,0
:NEXT
6A 95 PRINT"[DOWN]EVERYTHING O
K. THE DATA IS NOW IN MEMORY
":END
8B 100 DATA76,19,194,76,236,197
,76,37,195,76,79,197,76,150,
197,76,1957
0C 110 DATA254,205,76,50,206,11
9,0,0,2,4,6,1,3,5,7,1,939
6C 120 DATA160,0,164,0,168,0,17
2,0,176,0,180,0,184,72,191,0
,1467
30 130 DATA188,120,188,240,188,
104,189,224,189,88,190,208,1
90,254,253,251,3064
4C 140 DATA247,239,223,191,127,
83,89,83,52,57,49,53,53,13,0
,19,1578
1C 150 DATA83,89,83,52,57,49,53
,56,13,141,141,42,42,42,32,6
5,1040
4C 160 DATA66,79,82,84,69,68,32
,42,42,42,141,0,85,70,75,32,
1009
FD 170 DATA32,40,67,41,32,49,57
,56,55,32,71,46,72,65,67,75,
857
39 180 DATA87,79,82,84,72,32,78
,79,87,32,79,80,69,82,65,84,
1171
0D 190 DATA73,86,69,46,0,73,78,
70,79,82,77,65,84,73,79,78,1
112
74 200 DATA32,82,69,81,85,73,82
,69,68,32,66,69,70,79,82,69,
1108
E9 210 DATA32,80,82,79,67,69,69
,68,73,78,71,0,147,80,82,69,
1146
EA 220 DATA83,83,32,84,72,69,32
,70,85,78,67,84,73,79,78,32,
1101
78 230 DATA75,69,89,32,89,79,85
,32,87,73,83,72,32,84,79,32,
1092
14 240 DATA69,68,73,84,44,79,82
,32,80,82,69,83,83,32,39,70,
1069
45 250 DATA56,39,32,84,79,32,86
,73,69,87,32,75,69,89,32,68,
1002
06 260 DATA69,83,67,82,73,80,84
,73,79,78,83,46,0,147,80,82,
1206
68 270 DATA69,83,83,32,84,72,69
,32,70,85,78,67,84,73,79,78,
1138
AF 280 DATA32,75,69,89,32,89,79
,85,32,87,65,78,84,32,84,72,
1084
32 290 DATA69,13,68,69,83,67,82
,73,80,84,73,79,78,32,79,70,
1099
DB 300 DATA44,32,79,82,32,80,82
,69,83,83,32,39,70,56,39,32,
934
EB 310 DATA70,79,82,32,65,76,76
,32,79,70,84,72,69,32,68,69,
1055
AE 320 DATA83,67,82,73,80,84,73
,79,78,83,32,73,78,32,83,69,
1149
D3 330 DATA81,85,69,78,67,69,46
,0,147,68,69,83,67,82,73,80,
1164
F5 340 DATA84,73,79,78,32,70,79
,82,32,70,0,46,13,91,13,13,8
55
3A 350 DATA13,157,93,0,13,13,68
,79,32,89,79,85,32,87,65,78,
983
FB 360 DATA84,32,84,79,32,69,68
,73,84,32,84,72,69,32,68,69,
1031
D0 370 DATA83,67,82,73,80,84,73
,79,78,32,89,47,78,46,0,145,
1136
77 380 DATA79,78,67,69,32,70,73
,78,73,83,72,69,68,32,80,82,
1105
FB 390 DATA69,83,83,32,82,69,84
,85,82,78,32,84,79,32,67,79,
1120
75 400 DATA78,84,73,78,85,69,46
,32,0,147,32,68,79,32,89,79,
1071
3A 410 DATA85,32,87,65,78,84,32
,84,79,32,67,76,69,65,82,32,
1049
9F 420 DATA84,72,69,32,77,69,77
,79,82,89,32,40,89,47,78,41,
1057
06 430 DATA46,32,0,169,0,141,19
,207,120,169,55,141,20,3,169
,194,1485
14 440 DATA141,21,3,160,9,185,6
9,192,153,72,191,136,16,247,
32,106,1733
A1 450 DATA205,162,0,32,7,196,9
6,32,97,196,173,19,207,208,8
2,173,1885
0A 460 DATA107,207,208,10,165,1
97,205,106,207,240,64,206,10
7,207,173,141,2550
FF 470 DATA2,201,2,176,54,141,2
5,207,165,197,141,106,207,20
1,3,144,1972
7E 480 DATA42,201,7,176,38,201,
4,144,3,56,233,4,10,24,109,2
5,1277
B1 490 DATA207,141,26,207,238,1
07,207,10,168,185,31,192,133
,251,185,32,2320
09 500 DATA192,133,252,238,19,2
07,169,0,141,137,2,32,91,196
,76,49,1934
C5 510 DATA234,201,3,240,246,20
1,10,240,245,72,173,22,207,2
08,26,165,2493
4D 520 DATA197,201,63,208,20,10
4,169,1,141,19,207,169,89,13
3,251,169,2141
B1 530 DATA192,133,252,238,22,2
07,76,193,194,104,201,2,208,
3,76,197,2298
CF 540 DATA195,165,198,240,3,76
,139,194,160,0,177,251,240,2
7,201,255,2521
69 550 DATA208,6,32,150,197,76,
225,194,201,254,240,29,141,1
19,2,230,2304
BD 560 DATA198,162,251,32,102,1
96,76,139,194,206,19,207,169
,10,141,137,2239
73 570 DATA2,169,0,141,22,207,7
6,139,194,169,3,141,19,207,3
2,109,1630
32 580 DATA196,56,32,240,255,14
0,103,207,142,104,207,160,10
,132,198,136,2318
D2 590 DATA185,79,192,153,119,2
,136,16,247,165,212,141,105,
207,169,0,2128
24 600 DATA133,212,76,139,194,1
69,10,141,137,2,32,227,196,1
60,1,162,1991
94 610 DATA1,24,32,240,255,162,
1,32,7,196,162,251,32,102,19
6,160,1853
6A 620 DATA1,162,2,24,32,240,25
5,160,0,132,204,152,72,32,18
9,196,1853
EE 630 DATA170,104,168,138,201,
13,240,38,201,20,240,84,201,
141,240,46,2245
E1 640 DATA201,32,144,231,201,1
28,144,8,201,160,144,223,201
,192,176,219,2605
2F 650 DATA192,37,240,215,153,6
5,207,32,70,196,200,76,75,19
5,169,0,2122
32 660 DATA153,65,207,160,37,18
5,65,207,153,27,207,136,16,2
47,120,230,2215
8C 670 DATA204,169,27,133,253,1
69,207,133,254,169,0,141,137
,2,169,19,2186
59 680 DATA32,210,255,169,2,141
,19,207,238,21,207,88,96,76,
139,194,2094
7E 690 DATA192,1,144,151,136,32
,70,196,169,32,141,118,4,169
,93,141,1789
E4 700 DATA119,4,76,75,195,173,
21,207,240,21,172,103,207,17
4,104,207,2098
D8 710 DATA24,32,240,255,173,10
5,207,133,212,206,21,207,32,
142,196,165,2350
87 720 DATA198,240,11,201,1,240
,198,169,1,133,198,76,139,19
4,160,0,2159
9A 730 DATA177,253,240,13,141,1
19,2,230,198,162,253,32,102,
196,76,139,2333
39 740 DATA194,206,19,207,76,13
9,194,169,108,133,247,169,19
2,133,248,224,2658
5A 750 DATA0,240,33,142,20,207,
32,32,196,174,20,207,202,76,
15,196,1792
5E 760 DATA160,0,177,247,240,8,
162,247,32,102,196,76,32,196
,162,247,2284
1A 770 DATA32,102,196,96,160,0,
177,247,240,11,32,70,196,200
,208,246,2213
9A 780 DATA230,248,76,54,196,96
,141,22,192,152,72,138,72,17
3,22,192,2076
7B 790 DATA32,210,255,104,170,1
04,168,173,22,192,96,173,21,
192,133,1,2046
29 800 DATA96,169,54,133,1,96,2
46,0,208,2,246,1,96,160,159,
185,1852
43 810 DATA0,4,153,82,191,169,3
2,153,0,4,32,175,196,136,192
,255,1774
7C 820 DATA208,237,160,6,185,21
7,0,153,242,191,136,16,247,9
6,160,159,2413
81 830 DATA32,97,196,185,82,191

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LISTINGS

	,153,0,4,32,175,196,136,192,255,208,2134		3,200,176,26,201,7,240,3,76,101,1545		18,153,232,230,200,208,205,160,25,185,217,2833
4A	840 DATA242,160,6,185,242,191,153,217,0,136,16,247,76,60,197,185,2313	CE	1110 DATA198,160,0,140,26,207,152,72,32,101,198,104,176,6,168,200,1940	CB	1380 DATA0,153,0,232,136,16,247,96,160,0,120,169,53,133,1,185,1701
71	850 DATA0,216,190,115,206,153,115,206,138,153,0,216,96,165,197,201,2367	D6	1120 DATA192,7,208,239,96,162,4,32,7,196,173,26,207,24,105,49,1727	D3	1390 DATA0,224,153,0,4,185,0,225,153,0,5,185,0,226,153,0,1513
94	860 DATA63,208,26,32,142,195,169,107,133,253,169,192,133,254,169,89,2334	E5	1130 DATA32,210,255,162,5,32,7,196,173,26,207,10,168,185,47,192,1907	7D	1400 DATA6,185,232,226,153,232,6,185,0,228,153,0,216,185,0,229,2236
9F	870 DATA133,251,169,192,133,252,238,22,207,104,104,104,96,32,228,255,2520	95	1140 DATA133,251,185,48,192,133,252,160,116,32,97,196,177,251,153,41,2417	8F	1410 DATA153,0,217,185,0,230,153,0,218,185,232,230,153,232,218,200,2606
D3	880 DATA240,251,96,173,32,208,141,112,206,173,33,208,141,113,206,173,2506	88	1150 DATA4,136,16,248,32,91,196,162,6,32,7,196,32,143,200,144,1645	1E	1420 DATA208,205,160,25,185,0,232,153,217,0,136,16,247,169,55,133,2141
05	890 DATA134,2,141,114,206,169,1,141,32,208,141,33,208,169,0,141,1840	8B	1160 DATA1,96,208,253,32,84,201,133,204,141,111,206,169,118,141,110,2208	3A	1430 DATA1,88,96,32,108,200,176,19,201,133,144,247,201,141,176,243,2206
6F	900 DATA134,2,169,112,141,0,4,169,110,141,39,4,169,109,141,120,1564	0C	1170 DATA206,162,7,32,7,196,32,164,200,238,108,206,173,108,206,201,2246	71	1440 DATA56,233,133,168,185,23,192,141,26,207,24,96,165,197,201,63,2110
CD	910 DATA4,169,125,141,159,4,169,93,141,40,4,141,79,4,141,80,1494	A2	1180 DATA40,208,8,169,0,141,108,206,238,109,206,238,109,206,32,50,2068	E3	1450 DATA208,2,56,96,32,228,255,240,251,24,96,160,3,185,251,0,2087
2B	920 DATA4,141,119,4,160,37,169,64,153,1,4,153,121,4,136,16,1286	12	1190 DATA205,169,0,133,212,32,93,201,144,3,76,189,199,201,13,208,2078	16	1460 DATA72,185,97,206,153,251,0,104,153,97,206,136,16,239,96,32,2043
E7	930 DATA247,160,7,169,0,153,0,216,136,16,250,96,173,112,206,141,2082	8A	1200 DATA3,76,194,199,201,17208,23,172,101,206,192,78,176,199,72,2117	26	1470 DATA108,200,176,15,201,89,240,8,201,78,208,243,24,169,1,96,2057
BF	940 DATA32,208,173,113,206,141,33,208,173,114,206,141,134,2,96,169,2149	36	1210 DATA169,40,32,247,200,104,32,144,201,32,210,255,76,182,198,201,2323	55	1480 DATA24,169,0,96,173,101,206,141,91,206,173,102,206,141,92,206,2127
4F	950 DATA107,133,251,169,192,133,252,169,1,141,19,207,169,0,133,198,2274	D3	1220 DATA18,208,6,32,210,255,76,182,198,201,19,208,9,32,144,201,1999	38	1490 DATA169,40,141,95,206,169,0,141,96,206,32,202,200,173,91,206,2167
15	960 DATA96,238,23,207,208,18,238,24,207,173,24,207,201,19,144,8,2035	33	1230 DATA32,84,201,76,182,198,201,20,208,14,173,101,206,13,102,206,2017	01	1500 DATA141,109,206,173,93,206,141,108,206,96,162,17,169,0,168,240,2235
A1	970 DATA169,0,141,24,207,238,32,208,160,7,173,32,208,73,8,141,1821	CB	1240 DATA240,148,32,35,201,76,182,198,201,29,208,6,32,144,201,76,2009	20	1510 DATA22,46,93,206,46,94,206,56,173,93,206,237,95,206,168,173,2120
7B	980 DATA32,208,185,61,192,141,0,220,173,1,220,201,255,208,6,136,2239	00	1250 DATA165,199,201,145,208,23,172,101,206,192,40,144,39,72,169,40,2116	34	1520 DATA94,206,237,96,206,144,6,140,93,206,141,94,206,46,91,206,2212
B7	990 DATA16,240,76,97,197,96,173,32,208,141,112,206,32,97,197,173,2093	33	1260 DATA32,13,201,104,32,144,201,32,210,255,76,182,198,201,146,208,2235	BF	1530 DATA46,92,206,202,208,219,96,141,104,206,173,101,206,24,109,104,2237
3B	1000 DATA112,206,141,32,208,96,173,19,207,141,103,206,169,3,141,19,1976	B6	1270 DATA6,32,210,255,76,182,198,201,147,208,12,32,144,201,32,117,2053	FD	1540 DATA206,141,101,206,173,102,206,105,0,141,102,206,96,141,104,206,2236
1C	1010 DATA207,32,123,200,173,137,2,141,105,206,169,10,141,137,2,173,1958	5B	1280 DATA201,32,84,201,76,182,198,201,148,208,14,32,106,201,176,74,2134	3F	1550 DATA173,101,206,56,237,104,206,141,101,206,173,102,206,233,0,141,2386
77	1020 DATA32,208,141,112,206,173,33,208,141,113,206,173,134,2,141,114,2137	F8	1290 DATA32,144,201,32,61,201,76,182,198,201,157,208,24,173,101,206,2197	72	1560 DATA102,206,96,169,1,32,13,201,172,101,206,185,42,4,153,41,1724
D3	1030 DATA206,56,32,240,255,142,104,207,140,103,207,32,199,199,169,1,2292	EC	1300 DATA13,101,206,240,223,169,1,32,13,201,169,157,32,144,201,32,1934	46	1570 DATA4,200,204,110,206,208,244,169,32,141,158,4,96,160,117,185,2238
2B	1040 DATA141,32,208,141,33,208,169,0,141,134,2,96,32,166,197,32,1732	2E	1310 DATA210,255,76,182,198,201,32,144,203,201,128,144,8,201,160,144,2487	A2	1580 DATA40,4,153,41,4,136,204,101,206,208,244,169,32,153,41,4,1740
E0	1050 DATA47,198,32,8,200,24,174,104,207,172,103,207,32,240,255,173,2176	BB	1320 DATA195,201,192,176,191,32,106,201,176,16,32,210,255,169,1,32,2185	99	1590 DATA141,158,4,96,169,0,141,101,206,141,102,206,96,32,108,200,1901
10	1060 DATA112,206,141,32,208,173,113,206,141,33,208,173,114,206,141,134,2341	72	1330 DATA247,200,169,2,133,205,169,0,133,207,76,100,199,32,128,201,2201	E1	1600 DATA176,7,201,192,144,2,233,96,24,96,172,101,206,192,117,208,2167
37	1070 DATA2,32,123,200,173,105,206,141,137,2,173,103,206,141,19,207,1970	SE	1340 DATA56,96,32,128,201,24,96,160,0,185,0,4,153,0,224,185,1544	39	1610 DATA2,56,96,24,96,160,116,169,32,153,41,4,136,16,250,96,1447
CB	1080 DATA169,3,141,106,207,169,0,141,107,207,169,0,133,207,96,162,2017	E2	1350 DATA0,5,153,0,225,185,0,6,153,0,226,185,232,6,153,232,1761	2C	1620 DATA230,204,32,144,201,160,116,185,41,4,145,251,136,16,248,96,2209
B4	1090 DATA2,32,7,196,32,83,200,176,43,201,7,240,3,76,165,201,1664	EA	1360 DATA226,185,0,216,153,0,228,185,0,217,153,0,229,185,0,218,2195	E8	1630 DATA72,120,165,207,240,12,165,206,174,135,2,160,0,132,207,32,2029
76	1100 DATA162,3,32,7,196,32,83,200,176,43,201,7,240,3,76,165,201,1664	CB	1370 DATA153,0,230,185,232,2	F5	1640 DATA19,234,88,104,96,16

LISTINGS

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9,147,32,210,255,169,10,141,
19,207,169,2069
AD 1650 DATA15,141,32,208,32,97
,196,173,26,207,10,168,185,3
1,192,133,1846
0E 1660 DATA251,141,106,206,185
,32,192,133,252,141,107,206,
160,0,132,212,2456
92 1670 DATA177,251,208,8,169,4
6,32,27,204,76,59,202,201,13
,208,8,1889
7E 1680 DATA169,60,32,27,204,76
,51,202,201,19,208,8,169,83,
32,27,1568
58 1690 DATA204,76,51,202,201,2
0,208,8,169,68,32,27,204,76,
51,202,1799
87 1700 DATA201,141,208,8,169,9
5,32,27,204,76,51,202,201,14
7,208,8,1978
50 1710 DATA169,115,32,27,204,7
6,51,202,201,254,208,8,169,6
3,32,27,1838
49 1720 DATA204,76,51,202,201,2
55,208,8,169,35,32,27,204,76
,51,202,2001
06 1730 DATA32,210,255,162,251,
32,102,196,76,204,201,32,84,
201,133,204,2375
29 1740 DATA169,230,141,110,206
,169,3,141,111,206,32,164,20
0,32,50,205,2169
15 1750 DATA169,0,133,212,32,93
,201,144,3,76,244,203,201,13
,208,10,1942
AB 1760 DATA72,169,60,32,19,204
,104,76,220,203,201,17,208,3
4,172,109,1900
32 1770 DATA206,192,24,240,213,
192,23,208,7,172,108,206,192
,39,240,202,2464
FB 1780 DATA72,169,40,32,247,20
0,104,32,144,201,32,210,255,
76,74,202,2090
FA 1790 DATA201,19,208,9,32,144
,201,32,84,201,76,74,202,201
,20,208,1912
9F 1800 DATA29,173,101,206,13,1
02,206,240,161,32,144,201,12
0,32,67,204,2031
9A 1810 DATA32,164,200,32,50,20
5,169,1,133,205,88,76,74,202
,201,29,1861
63 1820 DATA208,22,32,249,204,1
44,3,76,74,202,32,144,201,32
,210,255,2088
86 1830 DATA169,1,32,247,200,76
,74,202,201,133,208,10,169,6
3,32,19,1836
EE 1840 DATA204,169,254,76,220,
203,201,134,208,10,169,35,32
,19,204,169,2307
64 1850 DATA255,76,220,203,201,
135,208,10,169,83,32,19,204,
169,19,76,2079
4E 1860 DATA220,203,201,137,208
,13,169,46,32,19,204,32,11,2
05,169,0,1869
88 1870 DATA76,220,203,201,138,
208,10,169,68,32,19,204,169,
20,76,220,2033
EF 1880 DATA203,201,139,208,10,
169,115,32,19,204,169,147,76
,220,203,201,2316
F3 1890 DATA140,208,3,76,244,20
3,201,141,208,10,72,169,95,3
2,19,204,2025
53 1900 DATA104,76,220,203,201,
145,208,24,172,109,206,208,3
,76,74,202,2231
0C 1910 DATA72,169,40,32,13,201

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,104,32,144,201,32,210,255,7
6,74,202,1857
CC 1920 DATA201,147,208,39,32,8
4,201,32,164,200,32,50,205,1
69,147,32,1943
C0 1930 DATA210,255,32,144,201,
120,169,174,141,0,4,32,61,20
5,169,0,1917
D2 1940 DATA32,43,204,169,1,133
,205,88,76,74,202,201,148,20
8,20,32,1836
94 1950 DATA249,204,176,93,32,1
44,201,120,32,155,204,169,1,
133,205,88,2206
37 1960 DATA76,74,202,201,157,2
08,24,173,101,206,13,102,206
,240,66,169,2218
A4 1970 DATA1,32,13,201,169,157
,32,144,201,32,210,255,76,74
,202,201,2000
40 1980 DATA32,144,46,201,128,1
44,8,201,160,144,38,201,192,
176,34,32,1881
56 1990 DATA249,204,176,29,72,3
2,210,255,104,76,225,203,32,
249,204,176,2496
DD 2000 DATA16,32,43,204,169,1,
32,247,200,169,2,133,205,169
,0,133,1755
E1 2010 DATA207,76,74,202,230,2
04,24,173,106,206,105,230,13
3,253,173,107,2503
D3 2020 DATA206,105,3,133,254,1
60,0,152,145,253,169,3,141,1
9,207,32,1982
56 2030 DATA91,196,96,72,32,249
,204,144,3,104,96,72,169,18,
32,210,1788
34 2040 DATA255,104,32,210,255,
169,146,32,210,255,96,72,24,
173,106,206,2345
72 2050 DATA109,101,206,133,251
,173,107,206,109,102,206,133
,252,160,0,104,2352
40 2060 DATA145,251,96,169,1,32
,13,201,173,101,206,133,247,
133,251,173,2325
7C 2070 DATA102,206,133,248,24,
105,4,133,252,24,173,106,206
,101,247,133,2197
F9 2080 DATA253,173,107,206,101
,248,133,254,160,1,177,251,1
36,145,251,200,2796
22 2090 DATA177,253,136,145,253
,162,251,32,102,196,162,253,
32,102,196,162,2614
7E 2100 DATA247,32,102,196,165,
247,205,110,206,208,221,165,
248,205,111,206,2874
BA 2110 DATA208,214,169,32,145,
251,169,0,145,253,96,169,229
,133,251,169,2633
48 2120 DATA7,133,252,24,173,10
6,206,105,229,133,253,173,10
7,206,105,3,2215
35 2130 DATA133,254,169,230,133
,247,169,3,133,248,160,0,177
,251,200,145,2652
AC 2140 DATA251,136,177,253,200
,145,253,162,251,32,238,204,
162,253,32,238,2987
93 2150 DATA204,162,247,32,238,
204,165,247,205,101,206,208,
221,165,248,205,3058
D0 2160 DATA102,206,208,214,169
,32,145,251,145,253,141,230,
7,96,214,0,2413
57 2170 DATA181,0,201,255,208,2
,214,1,96,160,230,204,101,20
6,208,9,2276
16 2180 DATA160,3,204,102,206,2

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08,2,56,96,24,96,173,101,206
,24,105,1766
7C 2190 DATA1,133,247,173,102,2
06,105,4,133,248,160,0,169,3
2,145,247,2105
A7 2200 DATA162,247,32,102,196,
166,247,224,231,208,243,166,
248,224,7,208,2911
C0 2210 DATA237,96,24,172,108,2
06,174,109,206,32,240,255,96
,169,0,133,2257
52 2220 DATA251,133,252,173,106
,206,133,253,173,107,206,133
,254,160,0,169,2709
A4 2230 DATA32,145,253,162,251,
32,102,196,162,253,32,102,19
6,165,251,201,2535
DB 2240 DATA232,208,236,165,252
,201,3,208,230,96,32,166,197
,162,8,32,2428
5F 2250 DATA7,196,32,143,200,17
6,2,240,4,32,242,197,96,160,
0,169,1896
98 2260 DATA32,153,0,160,153,0,
161,153,0,162,153,0,163,153,
0,164,1607
FF 2270 DATA153,0,165,153,0,166
,153,0,167,153,0,168,153,0,1
69,153,1753
46 2280 DATA0,170,153,0,171,153
,0,172,153,0,173,153,0,174,1
53,0,1625
68 2290 DATA175,153,0,176,153,0
,177,153,0,178,153,0,179,153
,0,180,1830
9C 2300 DATA153,0,181,153,0,182
,153,0,183,153,0,184,153,0,1
85,153,1833
40 2310 DATA0,186,153,0,187,153
,0,188,153,0,189,153,0,190,1
53,72,1777
60 2320 DATA190,200,208,157,169
,0,141,1,160,141,0,164,141,0
,168,141,1981
86 2330 DATA0,172,141,0,176,141
,0,180,141,0,184,76,121,205,
32,253,1822
19 2340 DATA174,32,212,225,32,1
23,200,162,71,160,191,169,0,
133,251,169,2304
87 2350 DATA160,133,252,173,19,
207,141,103,206,169,10,141,1
9,207,32,97,2069
F2 2360 DATA196,169,251,32,95,2
25,32,123,200,173,103,206,14
1,19,207,76,2248
AC 2370 DATA91,196,32,253,174,3
2,212,225,169,0,32,213,255,1
76,1,96,2157
FB 2380 DATA76,249,224,32,253,1
74,32,212,225,162,111,160,20
7,169,0,133,2419
42 2390 DATA249,169,192,133,250
,169,249,32,95,225,96,0,0,0,
0,0,1859

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PROGRAM: UFK DEMO

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65 10 REM *****
*****
04 13 REM * YOU MUST SYS 49152
(WITH UFK *

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FC 16 REM * IN MEMORY) AND PRES
S 'Y' TO *
46 18 REM * CLEAR THE DATA BEFO
RE RUNNING*
89 22 REM * THIS. ENTER IT EXAC
TLY AS IT *
1C 25 REM * LISTED BELOW. YOU C
AN SAVE *
85 28 REM * THE DEFINITIONS USIN
G THE SAVE*
DF 31 REM * SYS IN FIGURE 2 IF
YOU WISH, *
62 34 REM * ONCE THEY ARE IN ME
MORY. *
CA 37 REM *****
*****
2C 40 CL=100:IN=10
37 50 READDT:IFDT=-1THEN95
6E 60 IFDT>255THENAD=DT:GOTO50
FB 70 POKEAD,DT:AD=AD+1:CH=DT:F
ORB=1TO15:READDT:POKEAD,DT:A
D=AD+1:CH=CH+DT:NEXT
A0 80 READCK:IFCK<>CHTHENPRINT"
[DOWN2]ERROR IN LINE":CL:END
*****
35 90 PRINT"LINE":CL;"IS OK":CL
=CL+IN:GOTO50
6A 95 PRINT"[DOWN2]EVERYTHING O
K. THE DATA IS NOW IN MEMORY
":END
A3 99 DATA 40960
13 100 DATA32,65,61,254,58,66,6
1,254,58,67,61,254,13,73,70,
67,1514
89 110 DATA61,49,84,72,69,78,80
,82,73,78,84,34,147,34,65,59
,1149
9B 120 DATA34,43,34,59,66,59,34
,61,34,59,65,43,66,58,83,89,
887
C5 130 DATA83,52,57,49,54,49,13
,73,70,67,61,50,84,72,69,78,
981
8F 140 DATA80,82,73,78,84,34,14
7,34,65,59,34,45,34,59,66,59
,1033
F4 150 DATA34,61,34,59,65,45,66
,58,83,89,83,52,57,49,54,49,
938
83 160 DATA13,73,70,67,61,51,84
,72,69,78,80,82,73,78,84,34,
1069
82 170 DATA147,34,65,59,34,42,3
4,59,66,59,34,61,34,59,65,42
,894
FS 180 DATA66,58,83,89,83,52,57
,49,54,49,13,73,70,67,61,52,
976
DE 190 DATA65,78,68,66,60,62,48
,84,72,69,78,80,82,73,78,84,
1147
57 200 DATA34,147,34,65,59,34,4
7,34,59,66,59,34,61,34,59,65
,891
18 210 DATA47,66,58,83,89,83,52
,57,49,54,49,13,73,70,67,61,
971
7E 220 DATA52,84,72,69,78,80,82
,73,78,84,34,147,89,79,85,32
,1218
2D 230 DATA67,65,78,39,84,32,68
,73,86,73,68,69,32,66,89,32,
1021
C6 240 DATA90,69,82,79,46,34,58
,83,89,83,52,57,49,54,49,13,
987
83 250 DATA147,84,72,69,32,84,7
2,73,82,68,32,73,78,80,85,84
,1215
7A 260 DATA32,77,85,83,84,32,66
,69,32,70,82,79,77,32,49,32,
981
C4 270 DATA84,79,32,52,46,141,1
41,141,0,32,32,32,32,32,32,3
2,940
05 279 DATA 41984
ED 280 DATA76,79,65,68,34,36,34
,44,56,13,76,73,83,84,13,32,
866
AF 290 DATA255,20,32,69,78,84,6
9,82,32,65,32,70,73,76,69,78
,1184
28 300 DATA65,77,69,32,84,79,32
,76,79,65,68,32,70,82,79,77,
1066
84 310 DATA32,68,73,83,75,32,65
,78,68,32,82,85,78,32,40,79,
1002
91 320 DATA82,32,80,82,69,83,83
,32,82,85,78,32,83,84,79,80,
1146
7D 330 DATA32,84,79,32,81,85,73
,84,41,46,141,141,76,79,65,6
8,1207
3B 340 DATA34,254,34,44,56,13,8
2,85,78,13,0,32,32,32,32,32,
853
C4 349 DATA 43008
0E 350 DATA78,61,254,58,65,61,7
8,13,73,70,78,62,50,53,53,79
,1186
A3 360 DATA82,78,60,48,84,72,69
,78,80,82,73,78,84,34,147,78
,1227
D4 370 DATA85,77,66,69,82,32,87
,82,79,78,71,46,32,73,84,32,
1075
01 380 DATA83,72,79,85,76,68,32
,66,69,32,70,82,79,77,32,48,
1050
5B 390 DATA32,45,32,50,53,53,34
,58,83,89,83,52,57,49,54,49,
873
D9 400 DATA13,65,36,61,34,48,34
,58,73,70,78,62,49,50,55,84,
870
63 410 DATA72,69,78,78,61,78,45
,49,50,56,58,65,36,61,34,49,
939
84 420 DATA34,13,66,36,61,34,48
,34,58,73,70,78,62,54,51,84,
856
29 430 DATA72,69,78,78,61,78,45
,54,52,58,66,36,61,34,49,34,
925
3D 440 DATA13,67,36,61,34,48,34
,58,73,70,78,62,51,49,84,72,
890
30 450 DATA69,78,78,61,78,45,51
,50,58,67,36,61,34,49,34,13,
862
A2 460 DATA68,36,61,34,48,34,58
,73,70,78,62,49,53,84,72,69,
949
CD 470 DATA78,78,61,78,45,49,54
,58,68,36,61,34,49,34,13,69,
865
5D 480 DATA36,61,34,48,34,58,73
,70,78,62,55,84,72,69,78,78,
990
E0 490 DATA61,78,45,56,58,69,36
,61,34,49,34,13,70,36,61,34,
795
3C 500 DATA48,34,58,73,70,78,62
,51,84,72,69,78,78,61,78,45,
1039
93 510 DATA52,58,70,36,61,34,49
,34,13,71,36,61,34,48,34,58,
749
BE 520 DATA73,70,78,62,49,84,72
,69,78,78,61,78,45,49,58,71,
1075
F3 530 DATA36,61,34,49,34,13,72
,36,61,34,48,34,58,73,70,78,
791
34 540 DATA62,48,84,72,69,78,72
,36,61,34,49,34,13,73,36,61,
882
2D 550 DATA65,36,43,66,36,43,67
,36,43,68,36,43,69,36,43,70,
800
69 560 DATA36,43,71,36,43,72,36
,13,80,82,73,78,84,34,147,34
,962
18 570 DATA65,59,34,73,78,32,66
,73,78,65,82,89,32,73,83,32,
1014
32 580 DATA34,59,73,36,13,141,1
41,0,32,32,32,32,32,32,32,32
,753
5D 589 DATA 44032
02 590 DATA78,61,254,58,65,61,7
3,78,84,40,78,47,49,54,41,58
,1179
19 600 DATA66,61,78,45,65,42,49
,54,13,73,70,78,60,48,79,82,
963
BC 610 DATA78,62,50,53,53,84,72
,69,78,80,82,73,78,84,34,147
,1177
29 620 DATA78,85,77,66,69,82,32
,87,82,79,78,71,46,32,73,84,
1121
B3 630 DATA32,83,72,79,85,76,68
,32,66,69,32,70,82,79,77,32,
1034
E5 640 DATA48,32,84,79,32,50,53
,53,34,58,83,89,83,52,57,49,
936
F4 650 DATA54,49,13,67,61,65,43
,52,56,58,73,70,65,62,57,84,
929
ED 660 DATA72,69,78,67,61,67,43
,55,13,68,61,66,43,52,56,58,
929
C0 670 DATA73,70,66,62,57,84,72
,69,78,68,61,68,43,55,13,80,
1019
7E 680 DATA82,73,78,84,34,147,3
4,78,59,34,73,78,32,72,69,88
,1115
19 690 DATA32,73,83,32,36,34,59
,67,72,82,36,40,67,41,67,72,
893
8B 700 DATA82,36,40,68,41,13,14
1,141,0,32,32,32,32,32,32,32
,786
DC 709 DATA 45056
09 710 DATA79,61,254,58,73,61,2
54,58,80,61,254,58,82,61,49,
43,1586
8C 720 DATA80,47,49,48,48,58,89
,61,254,58,86,61,79,13,70,79
,1180
41 730 DATA82,67,61,49,84,79,89
,58,86,61,40,86,43,73,41,42,
1041
7E 740 DATA82,58,78,69,88,84,13
,63,34,147,79,82,73,71,73,78
,1172
6C 750 DATA65,76,32,66,65,76,65
,78,67,69,58,34,59,79,13,141
,1043
02 760 DATA141,141,141,141,141,
141,63,34,19,34,58,63,34,73,
78,86,1388
8E 770 DATA69,83,84,77,69,78,84
,32,66,69,70,79,82,69,32,73,
1116

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LISTINGS

42	780 DATA78,84,69,82,69,83,84,32,92,34,59,73,13,141,141,141,1275	2,73,83,32,84,72,69,78,32,80,1105	4,20,5,4,46,32,32,32,32,311
75	790 DATA141,141,141,141,63,34,19,34,58,63,58,63,34,73,78,84,1225	C8 1050 DATA82,69,83,83,32,82,85,78,32,83,84,79,80,32,78,79,1141	7E 1350 DATA32,32,32,32,32,32,32,2,32,32,32,32,32,32,32,32,512
FA	800 DATA69,82,69,83,84,32,82,65,84,69,32,65,84,34,59,80,1073	92 1060 DATA87,79,82,32,80,82,69,83,83,32,65,78,89,32,79,84,1136	EC 1360 DATA32,32,32,32,32,32,32,2,32,32,32,32,32,32,32,32,512
10	810 DATA59,34,37,34,13,141,141,141,141,141,141,63,34,19,34,1314	4A 1070 DATA72,69,82,32,75,69,89,32,84,79,32,67,79,78,84,73,1096	10 1370 DATA32,32,32,32,32,32,32,2,32,9,14,16,21,20,32,14,21,403
CA	820 DATA58,63,58,63,58,63,34,89,79,85,32,87,79,85,76,68,1077	CF 1080 DATA78,85,69,46,141,32,255,20,78,69,87,13,49,48,80,79,1229	4F 1380 DATA13,2,5,18,32,6,18,15,13,32,48,32,20,15,32,50,351
3A	830 DATA32,72,65,86,69,32,92,34,59,86,13,141,141,141,141,141,1345	7D 1090 DATA75,69,53,51,50,56,48,44,49,58,58,70,79,82,73,61,976	11 1390 DATA53,53,46,32,20,8,5,32,8,5,24,32,32,32,32,5,419
60	840 DATA141,141,63,34,19,34,58,63,58,63,58,63,58,63,34,65,1015	77 1100 DATA49,84,79,48,58,58,80,79,75,69,53,51,50,56,48,44,981	DD 1400 DATA17,21,9,22,1,12,5,14,20,32,9,19,32,3,1,12,229
SF	850 DATA70,84,69,82,34,89,59,34,32,89,69,65,82,83,46,34,1021	8F 1110 DATA48,58,58,71,79,84,79,49,48,13,147,141,141,141,141,1439	03 1410 DATA3,21,12,1,20,5,4,32,1,14,4,32,16,18,9,14,206
97	860 DATA13,0,32,32,32,32,32,32,32,32,32,32,32,32,32,461	00 1120 DATA141,141,141,141,141,141,141,32,32,32,32,32,32,32,32,32,2,80,82,1373	EB 1420 DATA20,5,4,46,32,32,32,32,32,32,32,32,32,32,32,459
4D	869 DATA 46080	06 1130 DATA69,84,84,89,32,66,79,82,68,69,82,32,80,65,84,84,1149	2E 1430 DATA32,32,32,32,32,32,32,2,32,32,32,32,32,32,32,32,512
E5	870 DATA65,36,61,67,72,82,36,40,49,51,41,43,67,72,82,36,900	4A 1140 DATA69,82,78,83,33,33,33,33,33,141,19,82,85,78,13,0,895	1C 1440 DATA32,32,32,32,32,32,32,2,32,32,32,32,32,32,32,32,512
65	880 DATA40,49,51,41,58,65,36,61,34,147,34,43,65,36,43,65,868	89 1149 DATA 48128	72 1450 DATA5,14,20,5,18,32,15,18,9,7,46,2,1,12,1,14,219
11	890 DATA36,13,66,36,61,34,69,78,84,69,82,32,66,79,82,68,955	30 1150 DATA9,14,16,21,20,32,20,23,15,32,14,21,13,2,5,18,275	31 1460 DATA3,5,44,32,25,5,1,18,12,25,32,9,14,22,5,19,271
A1	900 DATA69,82,32,67,79,76,79,85,82,34,13,67,36,61,34,69,965	27 1160 DATA19,32,40,1,38,2,41,46,9,14,16,21,20,3,61,32,395	76 1470 DATA20,13,5,14,20,44,32,9,14,20,5,18,5,19,20,32,290
A7	910 DATA78,84,69,82,32,83,67,82,69,69,78,32,67,79,76,79,1126	10 1170 DATA49,32,6,15,18,32,43,44,50,32,6,15,18,32,45,44,481	4C 1480 DATA18,1,20,5,44,14,21,13,2,5,18,32,15,6,32,25,271
50	920 DATA85,82,34,13,68,36,61,34,69,78,84,69,82,32,67,85,979	4C 1180 DATA32,51,32,6,15,18,32,42,44,32,52,32,6,15,18,32,459	03 1490 DATA5,1,18,19,46,20,8,5,32,1,13,15,21,14,20,20,258
3E	930 DATA82,83,79,82,32,67,79,76,79,85,82,34,13,80,82,73,1108	6B 1190 DATA47,46,32,20,8,5,14,32,1,14,19,23,5,18,32,9,325	41 1500 DATA8,1,20,32,23,15,21,12,4,32,2,5,32,9,14,32,262
98	940 DATA78,84,65,36,59,66,36,59,34,19,34,59,13,66,61,254,1023	50 1200 DATA19,32,20,8,5,14,32,16,18,9,14,20,5,4,46,32,294	09 1510 DATA20,8,5,32,2,1,14,11,32,9,19,32,16,18,9,14,242
DE	950 DATA13,80,82,73,78,84,65,36,59,67,36,59,34,19,34,59,878	8A 1210 DATA1,32,2,9,20,32,19,9,12,12,25,32,20,8,9,19,261	7C 1520 DATA20,5,4,33,33,32,32,32,5,14,20,5,18,32,2,15,302
77	960 DATA13,67,61,254,13,80,82,73,78,84,65,36,59,68,36,59,1128	AD 1220 DATA32,15,14,5,33,32,32,32,12,15,1,4,19,32,4,9,291	84 1530 DATA18,4,5,18,44,19,3,18,5,5,14,44,3,21,18,19,258
94	970 DATA34,19,34,59,13,68,61,254,13,80,82,73,78,84,65,36,1053	D4 1230 DATA18,5,3,20,15,18,25,44,12,9,19,20,19,32,1,14,274	E4 1540 DATA15,18,32,3,15,12,15,21,18,19,32,1,19,32,32,20,304
D0	980 DATA13,80,79,75,69,53,51,50,56,48,44,66,58,80,79,75,976	0B 1240 DATA4,32,23,1,9,20,19,32,6,15,18,32,11,5,25,46,298	95 1550 DATA8,5,9,18,32,14,21,13,2,5,18,19,46,32,32,32,306
7B	990 DATA69,53,51,50,56,49,44,67,58,80,79,75,69,54,52,54,960	DB 1250 DATA20,8,5,14,32,7,5,20,19,32,1,32,6,9,12,5,227	45 1560 DATA32,32,32,32,32,32,32,2,32,32,32,32,32,32,32,512
4D	1000 DATA44,68,58,80,82,73,78,84,65,36,13,0,32,32,32,32,809	8F 1260 DATA14,1,13,5,32,20,15,32,12,15,1,4,32,1,14,4,215	33 1570 DATA32,32,32,32,32,32,32,2,32,32,32,32,32,32,32,512
2F	1009 DATA 47104	9A 1270 DATA32,18,21,14,46,32,32,2,20,1,16,5,32,21,19,5,18,332	F9 1580 DATA32,32,32,32,32,32,32,2,32,32,32,32,32,32,32,512
C9	1010 DATA147,84,72,73,83,32,80,82,79,71,82,65,77,32,87,73,1219	26 1280 DATA19,32,4,15,32,14,15,20,32,21,19,5,32,6,50,33,349	E7 1590 DATA32,32,32,32,32,32,32,2,32,32,32,32,32,32,32,512
92	1020 DATA76,76,32,80,69,82,70,79,82,77,32,65,32,78,69,87,1086	22 1290 DATA32,32,32,32,32,32,32,2,32,32,32,32,32,32,32,512	A6 1600 DATA16,5,18,6,15,18,13,19,32,1,32,14,5,23,32,9,258
AE	1030 DATA46,32,73,70,32,89,79,85,32,68,79,32,78,79,84,32,990	7D 1300 DATA9,14,16,21,20,32,1,32,14,21,13,2,5,18,32,6,256	69 1610 DATA6,32,25,15,21,32,16,18,5,19,19,32,1,32,11,5,289
0F	1040 DATA87,65,78,84,32,84,7	AE 1310 DATA18,15,13,32,48,32,20,15,32,50,53,53,46,20,8,5,460	BB 1620 DATA25,32,40,18,21,14,32,19,20,15,16,32,23,9,12,12,340
		F2 1320 DATA32,2,9,14,1,18,25,5,17,21,9,22,1,12,5,14,207	EB 1630 DATA32,1,2,15,18,20,41,32,1,14,4,32,3,18,5,1,239
		3E 1330 DATA20,32,9,19,32,3,1,12,3,21,12,1,20,5,4,32,226	5C 1640 DATA20,5,19,32,1,32,19,13,1,12,12,32,1,14,4,19,236
		11 1340 DATA1,14,4,32,16,18,9,1	A1 1650 DATA9,12,12,25,32,2,1,19,9,3,32,16,18,15,7,18,230
			A0 1660 DATA1,13,32,23,8,9,3,8,32,9,20,32,18,21,14,19,262
			33 1670 DATA -1

Morse Code Tutor



program: morse loader

Read the instructions with the article BEFORE running this program.

```

97 40 FL=100:LL=2900:IN=10:AD=2
    049:CS=1
E4 50 FORA=0TO(LL-FL)/IN
4D 60 FORB=1TO16:READDI:POKEAD,
    DI:AD=AD+1:CH=CH+DI:NEXT
6D 70 IFCS=1THENREADCK:IFCK=CHT
    KENCH=0:PRINT"LINE":FL+A*IN;
    "IS OK":NEXT:GOTO90
65 75 IFCS=0THENNEXT:GOTO90
F3 80 PRINT"CDOWN2JERROR IN LIN
    E":FL+A*IN:END
ED 90 PRINT"CDOWN2JEVERYTHING O
    K. THE DATA IS NOW IN MEMORY
    ":END
2F 100 DATA27,8,195,7,158,32,50
    ,48,56,48,32,40,67,41,32,71,
    912
FC 110 DATA46,72,65,67,75,87,17
    6,84,72,0,0,0,49,50,0,78,818

02 120 DATA111,17,0,3,8,13,17,1
    9,24,28,33,36,41,45,50,53,49
    8
5F 130 DATA56,60,65,70,74,78,80
    ,84,89,93,98,103,108,114,120
    ,126,1418
55 140 DATA132,138,144,150,156,
    162,168,175,182,188,195,202,
    209,215,221,228,2865
D3 150 DATA234,1,3,0,3,1,1,1,0,
    3,1,3,1,0,3,1,256
66 160 DATA1,0,1,0,1,1,3,1,0,3,
    3,1,0,1,1,1,18
97 170 DATA1,0,1,1,0,1,3,3,3,0,
    3,1,3,0,1,3,24
55 180 DATA1,1,0,3,3,0,3,1,0,3,
    3,3,0,1,3,3,28
7F 190 DATA1,0,3,3,1,3,0,1,3,1,
    0,1,1,0,3,22
49 200 DATA0,1,1,3,0,1,1,1,3,0,
    1,3,3,0,3,1,22
89 210 DATA1,3,0,3,1,3,3,0,3,3,
    1,1,0,1,3,3,29
DB 220 DATA3,3,0,1,1,3,3,3,0,1,
    1,1,3,3,0,1,27
A0 230 DATA1,1,1,3,0,1,1,1,1,1,
    0,3,1,1,1,1,18
83 240 DATA0,3,3,1,1,1,0,3,3,3,
    1,1,0,3,3,3,29
42 250 DATA3,1,0,3,3,3,3,3,0,1,
    3,1,3,1,3,0,31
FF 260 DATA3,3,1,1,3,3,0,3,3,3,
    1,1,0,1,1,3,30
8E 270 DATA3,1,1,0,1,3,3,3,3,1,
    0,3,1,1,1,1,26
40 280 DATA3,0,3,1,1,3,1,0,3,1,
    3,3,1,0,3,1,27
CB 290 DATA3,3,1,3,0,3,1,1,1,3,
    0,1,3,1,1,3,28
FE 300 DATA1,0,147,28,32,32,32,
    32,32,32,32,32,32,32,32,5
    60
9C 310 DATA32,32,77,79,82,83,69
    ,32,84,69,83,84,69,82,13,150
    ,1120
FB 320 DATA32,32,32,32,32,32,32
    ,32,32,32,32,32,32,96,96,
    640
EA 330 DATA96,96,96,96,96,96,96
    ,96,96,96,13,13,13,31,32,49,
    1111
3A 340 DATA41,32,83,69,76,69,67
    ,84,32,67,72,65,82,65,67,84,
    1055
77 350 DATA69,82,83,32,84,79,32
    ,66,69,32,84,69,83,84,69,68,
    1085
61 360 DATA46,13,13,32,50,41,32
    ,73,78,80,85,84,32,83,84,82,
    908
80 370 DATA73,78,71,83,32,84,79
    ,32,66,69,32,83,69,78,84,46,
    1059
24 380 DATA13,13,32,51,41,32,66
    ,69,71,73,78,32,84,69,83,84,
    891
CA 390 DATA46,13,13,13,155,117,
    96,96,96,96,96,96,96,96,9
    6,1317
5F 400 DATA96,96,96,96,96,96,96
    ,96,96,96,96,96,96,96,96,
    1536
E1 410 DATA96,96,96,96,96,96,96
    ,96,96,96,96,96,105,98,13,15
    7,1525
D3 420 DATA98,171,96,96,96,96,9
    6,96,96,96,96,96,96,96,96
    ,1613
4D 430 DATA96,96,96,96,96,96,96
    ,96,96,96,96,96,96,96,96,
    1536
F5 440 DATA96,96,96,96,96,96,96
    ,96,179,98,13,157,98,171,96,
    96,1676
21 450 DATA96,96,96,96,96,96,96
    ,96,96,96,96,96,96,96,96,
    1536
0B 460 DATA96,96,96,96,96,96,96
    ,96,96,96,96,96,96,96,96,
    1536
4B 470 DATA96,96,96,96,179,98,1
    3,157,98,171,96,96,96,96,96,
    96,1676
AF 480 DATA96,96,96,96,96,96,96
    ,96,96,96,96,96,96,96,96,
    1536
C9 490 DATA96,96,96,96,96,96,96
    ,96,96,96,96,96,96,96,96,
    1536
BC 500 DATA179,98,13,157,98,106
    ,96,96,96,96,96,96,96,96,96,
    96,1611
1D 510 DATA96,96,96,96,96,96,96
    ,96,96,96,96,96,96,96,96,
    1536
3E 520 DATA96,96,96,96,96,96,96
    ,96,96,96,96,96,107,13,144,3
    2,1448
3B 530 DATA32,32,32,32,32,32,32
    ,32,32,80,76,69,65,83,69,32,
    762
DA 540 DATA83,69,76,69,67,84,32
    ,79,80,84,73,79,78,13,13,13,
    992
6E 550 DATA28,32,32,32,32,32,32
    ,32,32,32,32,40,67,41,32,49,
    577
29 560 DATA57,56,55,32,71,46,72
    ,65,67,75,87,79,82,84,72,19,
    1019
52 570 DATA17,17,17,17,17,17,17
    ,17,17,17,17,17,29,152,87,79
    ,551
99 580 DATA82,68,83,32,80,69,82
    ,32,77,73,78,85,84,69,58,17,
    1069
6A 590 DATA17,157,157,157,157,1
    57,157,157,157,157,157,1
    57,157,157,2372
82 600 DATA157,157,68,69,76,65,
    89,32,66,69,84,87,69,69,78,3
    2,1267
AB 610 DATA76,69,84,84,69,82,83
    ,58,17,17,157,157,157,157,15
    7,157,1581
69 620 DATA157,157,157,157,157,
    157,157,157,157,157,157,157,
    157,157,157,2512
5B 630 DATA68,69,76,65,89,32,66
    ,69,84,87,69,69,78,32,87,79,
    1119
76 640 DATA82,68,83,58,17,17,15
    7,157,157,157,157,157,157,15
    7,157,157,1895
1B 650 DATA157,157,157,157,157,
    157,157,157,157,157,78,79,46
    ,32,79,70,1954
24 660 DATA32,71,82,79,85,80,83
    ,32,84,79,32,66,69,32,83,69,
    1058
71 670 DATA78,84,58,29,29,29,29
    ,29,29,145,145,145,145,145,1
    45,154,1418
D0 680 DATA40,70,49,47,70,50,41
    ,17,17,157,157,157,157,157,1
    57,157,1500
AC 690 DATA40,70,51,47,70,52,41
    ,17,17,17,17,157,157,157,157
    ,157,1224
67 700 DATA157,157,40,70,53,47,
    70,54,41,19,0,1,2,3,4,5,723
7C 710 DATA6,7,8,9,10,11,12,13,
    14,15,16,17,18,19,20,21,216
C6 720 DATA22,23,24,25,26,49,50
    ,51,52,53,54,55,56,57,48,46,
    691
81 730 DATA44,58,63,39,45,47,40
    ,41,61,34,128,128,128,128,12
    8,128,1240
F3 740 DATA128,128,128,128,128,
    128,128,128,128,128,128,128,
    128,128,128,2048
81 750 DATA128,128,128,128,128,
    128,128,128,128,128,128,128,
    128,128,128,2048
54 760 DATA128,128,128,128,128,
    128,128,128,128,11,10,3,7,20
    ,0,68,1271
3B 770 DATA79,84,83,0,0,0,40,0,
    0,0,4,0,147,28,32,32,529
9F 780 DATA32,32,32,32,32,32,32
    ,32,67,72,65,82,65,67,84,69,
    827
83 790 DATA82,32,83,69,76,69,67
    ,84,73,79,78,46,13,150,32,32
    ,1065
37 800 DATA32,32,32,32,32,32,32
    ,32,96,96,96,96,96,96,96,96,
    1024
59 810 DATA96,96,96,96,96,96,96
    ,96,96,96,96,96,13,13,13,154
    ,1345
E0 820 DATA32,76,69,84,84,69,82
    ,83,58,13,155,32,176,96,96,9
    6,1301
8F 830 DATA96,96,96,96,96,96,96
    ,96,96,96,96,96,96,96,96,
    1536
FA 840 DATA96,96,96,96,96,96,96
    ,174,31,32,67,84,82,76,43,76
    ,1337
B3 850 DATA13,155,32,98,32,32,3
    2,32,32,32,32,32,32,32,32,
    682
06 860 DATA32,32,32,32,32,32,32
    ,32,32,32,32,32,32,98,31,
    577
D7 870 DATA32,84,79,71,71,76,69

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LISTINGS

	,83,13,155,32,173,96,96,96,9		,157,157,98,31,32,82,69,86,6	EF	1420 DATA13,32,32,32,32,32,3
	6,1322		9,82,83,1731		2,32,80,82,69,83,83,32,70,56
51	880 DATA96,96,96,96,96,96,96	EB	1150 DATA69,32,67,72,65,82,3	59	1430 DATA32,84,79,32,82,69,8
	,96,96,96,96,96,96,96,96,96,		2,155,98,13,176,96,96,96,96,		4,85,82,78,32,84,79,32,77,69
	1536		96,1341		,1080
0D	890 DATA96,96,96,96,96,96,18	9E	1160 DATA96,96,96,96,96,96,9	70	1440 DATA78,85,19,0,0,0,0,14
	9,31,32,65,76,76,46,13,13,15		6,96,96,96,96,96,96,96,96,96		7,31,13,13,13,13,13,13,45
	4,1271		,1536		1
SA	900 DATA32,78,85,77,66,69,82	B1	1170 DATA96,179,31,32,73,83,	37	1450 DATA13,13,13,13,13,32,3
	,83,58,32,32,32,32,32,32,32,		32,69,78,65,66,76,69,68,46,3		2,32,32,32,32,32,32,32,32
	854		2,1095		,417
15	910 DATA32,32,32,32,32,32,32	75	1180 DATA32,155,98,13,98,13,	C1	1460 DATA80,82,69,83,83,32,7
	,155,176,96,96,96,96,96,96,9		157,157,157,157,157,157,157,		0,56,32,84,79,32,65,66,79,82
	6,1227		157,157,157,1979		,1074
68	920 DATA96,96,96,96,96,96,96	A1	1190 DATA157,157,157,157,157	40	1470 DATA84,46,0,147,31,13,1
	,174,13,32,176,96,96,96,96,9		,157,157,98,13,157,157,98,13		3,13,13,13,13,13,13,13,13
	6,1547		,98,31,32,1796		,451
05	930 DATA96,96,96,96,96,174,3	SE	1200 DATA32,32,70,49,32,69,7	DA	1480 DATA13,32,32,32,32,32,3
	1,32,67,84,82,76,43,78,32,32		8,65,66,76,69,83,32,65,76,76		2,32,32,32,32,32,32,80,76
	,1211		,970		,585
35	940 DATA32,155,98,150,32,73,	C0	1210 DATA46,32,32,32,32,155,	88	1490 DATA69,65,83,69,32,87,6
	78,83,84,82,85,67,84,73,79,7		171,96,96,96,96,96,96,96,96,		5,73,84,46,46,46,0,0,0,765
	8,1333		96,1364		
04	950 DATA83,32,155,98,13,32,9	56	1220 DATA96,96,96,96,96,189,	90	1500 DATA0,147,31,32,32,32,3
	8,32,32,32,32,32,32,32,32,32		13,98,31,32,32,32,70,51,32,6		2,84,72,73,83,32,73,83,32,65
	,799		8,1128		,903
BC	960 DATA32,98,31,32,84,79,71	78	1230 DATA73,83,65,66,76,69,8	3F	1510 DATA32,76,73,83,84,32,7
	,71,76,69,83,32,32,155,98,13		3,32,65,76,76,46,32,32,32,15		9,70,32,84,72,69,32,67,72,65
	,1056		5,1061		,1022
68	970 DATA157,157,98,13,32,173	6E	1240 DATA98,13,98,13,157,157	16	1520 DATA82,65,67,84,69,82,8
	,96,96,96,96,96,96,96,96,96,		,157,157,157,157,157,157,157,		3,13,32,84,72,65,84,32,87,69
	96,1590		,157,157,157,2106		,1070
EB	980 DATA189,31,32,65,76,76,4	8F	1250 DATA157,157,157,157,157	AD	1530 DATA82,69,32,83,69,78,8
	6,32,32,32,32,32,155,98,151,		,98,144,32,32,70,56,32,84,79		4,46,32,80,82,69,83,83,32,65
	32,1111		,32,69,1513		,1069
A3	990 DATA80,82,69,83,83,73,78	03	1260 DATA88,73,84,13,155,173	89	1540 DATA32,75,69,89,32,84,7
	,71,32,84,72,69,32,155,98,13		,96,96,96,96,96,96,96,96,96,		9,32,68,73,83,80,76,65,89,13
	,1174		96,1546		,1039
50	1000 DATA13,157,157,157,157,	DE	1270 DATA96,96,96,96,96,96,9	13	1550 DATA32,32,32,32,32,32,8
	157,157,157,157,157,157,157,		6,96,96,96,96,96,189,0,65,66		4,72,69,32,78,69,88,84,32,87
	157,157,157,157,2368		,1472		,887
26	1010 DATA157,157,98,151,32,6	AD	1280 DATA67,68,69,70,71,72,7	C7	1560 DATA79,82,68,32,84,72,6
	7,72,65,82,65,67,84,69,82,32		3,74,75,76,77,78,79,80,81,82		5,84,32,87,65,83,32,83,69,78
	,79,1359		,1192		,1095
32	1020 DATA78,32,155,98,13,154	FF	1290 DATA83,84,85,86,87,88,8	E3	1570 DATA84,46,13,13,28,0,13
	,32,80,85,78,67,84,85,65,84,		9,90,49,50,51,52,53,54,55,56		,13,13,13,13,31,80,82,69,83,
	73,1263		,1112		594
BD	1030 DATA79,78,58,32,32,32,3	F5	1300 DATA57,48,46,44,58,63,3	76	1580 DATA83,32,65,78,89,32,7
	2,32,32,32,32,32,32,155,98,1		9,45,47,40,41,61,34,5,9,11,6		5,69,89,32,84,79,32,82,69,84
	51,939		48		,1074
16	1040 DATA32,84,72,69,32,75,6	A3	1310 DATA7,1,9,9,7,3,13,9,9,	87	1590 DATA85,82,78,32,84,79,3
	9,89,66,79,65,82,68,32,155,9		7,5,11,11,13,7,5,126		2,84,72,69,32,77,65,73,78,32
	8,1167	0A	1320 DATA3,7,9,9,11,13,11,17		,1054
12	1050 DATA13,32,176,96,96,96,		,15,13,11,9,11,13,15,17,184		
	96,96,96,96,96,96,96,96,174,	06	1330 DATA19,17,19,15,15,19,1	88	1600 DATA77,69,78,85,0,15,67
	31,1482		5,13,15,19,13,15,46,47,221,2		,0,0,0,78,156,234,0,169,1,10
A2	1060 DATA32,67,84,82,76,43,8		,510		29
	0,32,32,155,98,151,32,87,73,	1B	1340 DATA2,0,16,1,189,0,16,1	88	1610 DATA141,32,208,169,1,14
	76,1200		47,31,28,32,32,32,32,32,32,6		1,33,208,169,255,141,138,2,1
5A	1070 DATA76,32,84,79,71,71,7		22		69,0,141,1948
	6,69,32,32,155,98,13,32,98,3	0F	1350 DATA32,32,32,32,32,32,3	9A	1620 DATA145,2,169,142,32,21
	2,1050		2,77,69,83,83,65,71,69,32,83		0,255,169,128,141,145,2,169,
46	1080 DATA32,32,32,32,32,32,3		,856		67,133,251,2160
	2,32,32,32,98,31,32,84,79,71	7C	1360 DATA69,78,68,69,82,13,1	F4	1630 DATA169,9,133,252,32,15
	,715		50,32,32,32,32,32,32,32,32,3		5,17,76,173,17,160,0,177,251
F9	1090 DATA71,76,69,83,32,155,		2,817		,240,11,1872
	98,151,32,73,84,39,83,32,69,	EF	1370 DATA32,32,32,32,96,96,9	08	1640 DATA32,210,255,200,208,
	78,1225		6,96,96,96,96,96,96,96,96,96		246,230,252,76,157,17,96,169
34	1100 DATA65,66,76,69,32,32,1		,1280		,11,141,134,2434
	55,98,13,32,173,96,96,96,96,	77	1380 DATA96,96,13,13,31,69,7	96	1650 DATA2,160,19,162,12,24,
	96,1291		8,84,69,82,32,84,69,88,84,58		32,240,255,169,0,174,43,12,3
75	1110 DATA96,96,96,96,96,96,1		,1046		2,205,1541
	89,31,32,65,76,76,46,32,32,3	F2	1390 DATA32,40,80,82,69,83,8	AF	1660 DATA189,169,32,32,210,2
	2,1187		3,32,82,69,84,85,82,78,32,84		55,160,24,162,14,24,32,240,2
88	1120 DATA32,155,98,151,32,79		,1097		55,169,0,1967
	,82,32,68,73,83,65,66,76,69,	D0	1400 DATA79,32,83,69,78,68,4	4E	1670 DATA174,44,12,32,205,18
	46,1207		1,13,13,151,91,13,13,13,13,1		9,169,12,141,134,2,169,32,32
01	1130 DATA32,32,155,98,13,13,		3,783		,210,255,1812
	157,157,157,157,157,157,157,	02	1410 DATA13,13,13,13,13,13,1	FC	1680 DATA32,119,18,169,11,14
	157,157,157,1913		3,13,13,13,13,13,13,157,93,3		1,134,2,160,22,162,16,24,32,
95	1140 DATA157,157,157,157,157		1,450		240,255,1537

LISTINGS

10	1690 DATA169,0,174,45,12,32,205,189,169,12,141,134,2,169,32,32,1517	C5	162,26,1622	F0	8,10,173,1662
50	1700 DATA210,255,32,119,18,169,32,32,210,255,169,11,141,134,2,160,1949	1B	1960 DATA76,175,19,160,26,162,10,76,175,19,160,36,162,11,185,251,1703	4A	2230 DATA193,15,201,2,176,3,238,199,15,96,173,195,15,13,196,15,1745
40	1710 DATA27,162,18,24,32,240,255,173,47,12,174,46,12,32,205,189,1648	63	1970 DATA11,73,128,153,251,1,1,200,202,208,244,76,60,19,169,12,141,1958	FC	2240 DATA56,240,45,162,17,169,0,168,240,22,46,197,15,46,198,15,1636
4C	1720 DATA169,32,32,210,255,3,2,210,255,32,134,18,201,133,208,3,76,2000	B9	1980 DATA134,2,169,242,133,251,169,4,133,252,162,26,160,0,32,241,2110	27	2250 DATA56,173,197,15,237,195,15,168,173,198,15,237,196,15,144,6,2040
58	1730 DATA140,18,201,137,208,3,76,158,18,201,134,208,3,76,176,18,1775	B7	1990 DATA19,169,186,133,251,169,5,133,252,162,10,160,26,32,241,19,1967	06	2260 DATA140,197,15,141,198,15,46,193,15,46,194,15,202,208,219,24,1868
2D	1740 DATA201,138,208,3,76,203,18,201,135,208,3,76,221,18,201,139,2049	9A	2000 DATA169,130,133,251,169,6,133,252,162,11,160,36,32,241,19,96,2000	8E	2270 DATA96,169,0,141,57,12,141,58,12,162,17,24,110,58,12,110,1179
47	1750 DATA208,3,76,13,19,201,49,208,6,32,49,19,76,111,17,201,1288	89	2010 DATA185,251,11,25,204,1,1,140,189,15,160,0,145,251,172,189,15,1963	97	2280 DATA57,12,110,56,12,110,55,12,144,19,24,173,59,12,109,57,1021
BB	1760 DATA50,208,6,32,214,21,76,111,17,201,51,208,6,32,226,22,1481	7D	2020 DATA200,230,251,208,2,230,252,202,208,230,96,169,0,141,190,15,2624	27	2290 DATA12,141,57,12,173,60,12,109,58,12,141,58,12,202,208,220,1487
04	1770 DATA76,111,17,76,41,18,160,0,185,48,12,240,7,32,210,255,1488	04	2030 DATA141,191,15,141,192,15,160,46,185,251,11,240,21,238,190,15,2052	28	2300 DATA96,24,173,55,12,109,191,15,141,191,15,173,56,12,109,192,1564
1E	1780 DATA200,76,121,18,96,32,228,255,240,251,96,238,43,12,173,43,2122	FF	2040 DATA24,185,142,15,109,191,15,141,191,15,173,192,15,105,0,141,1654	28	2310 DATA15,141,192,15,96,169,200,133,251,169,15,133,252,32,155,17,1985
D0	1790 DATA12,201,51,208,5,169,5,141,43,12,76,173,17,206,43,12,1374	80	2050 DATA192,15,136,16,227,169,0,141,196,15,173,190,15,141,195,15,1836	82	2320 DATA169,17,141,191,15,169,2,141,192,15,169,47,141,190,15,32,1646
F6	1800 DATA173,43,12,201,4,208,243,169,50,141,43,12,76,155,18,238,1786	7E	2060 DATA173,191,15,141,193,15,173,192,15,141,194,15,32,91,21,173,1775	21	2330 DATA54,20,160,1,162,5,24,32,240,255,169,12,141,134,2,169,1580
AC	1810 DATA44,12,173,44,12,201,10,208,5,169,3,141,44,12,24,173,1275	29	2070 DATA193,15,141,42,12,173,197,15,141,195,15,173,198,15,141,196,1862	26	2340 DATA0,133,204,169,0,141,101,16,141,102,16,32,134,18,201,140,1548
5C	1820 DATA44,12,105,4,141,45,12,76,155,18,206,44,12,173,44,12,1103	2D	2080 DATA15,169,0,141,194,15,173,190,15,141,193,15,32,91,21,173,1578	E4	2350 DATA208,5,169,1,133,204,96,201,13,208,7,169,1,133,204,76,1828
11	1830 DATA201,2,208,234,169,9,141,44,12,76,191,18,238,46,12,208,1809	D7	2090 DATA194,15,208,10,173,193,15,201,2,176,3,238,42,12,169,0,1651	22	2360 DATA195,22,201,32,208,8,141,103,16,169,50,76,120,22,201,20,1584
E8	1840 DATA3,238,47,12,24,173,46,12,105,24,141,53,12,173,47,12,1122	3B	2100 DATA141,191,15,141,192,15,141,56,12,141,60,12,173,42,12,141,1485	B1	2370 DATA208,46,173,102,16,208,5,173,101,16,240,207,206,101,16,173,1991
48	1850 DATA105,252,141,54,12,173,53,12,208,15,173,54,12,208,10,169,1651	A6	2110 DATA55,12,173,43,12,141,59,12,32,146,21,32,194,21,169,0,1122	FA	2380 DATA101,16,201,255,208,3,206,102,16,169,20,32,210,255,169,32,1995
28	1860 DATA0,141,47,12,169,1,141,46,12,76,155,18,206,46,12,173,1255	57	2120 DATA141,56,12,141,60,12,173,43,12,141,59,12,173,44,12,141,1232	00	2390 DATA141,150,7,169,29,141,151,7,169,11,141,151,219,76,12,22,1596
02	1870 DATA46,12,201,255,208,3,206,47,12,173,46,12,208,235,173,47,1884	C7	2130 DATA55,12,32,146,21,32,194,21,173,191,15,141,55,12,173,192,1465	BC	2400 DATA141,103,16,160,46,185,95,15,205,103,16,208,4,15,2,76,120,1645
BF	1880 DATA12,208,230,169,231,141,46,12,169,3,141,47,12,76,155,18,1670	71	2140 DATA15,141,56,12,169,0,141,60,12,141,191,15,141,192,15,169,1470	10	2410 DATA22,136,16,241,76,12,22,32,126,22,76,12,22,170,173,101,1259
BF	1890 DATA169,61,133,251,169,12,133,252,32,155,17,32,190,19,32,134,1791	16	2150 DATA5,141,59,12,32,146,21,32,194,21,56,173,191,15,237,44,1379	7E	2420 DATA16,24,105,51,141,53,12,173,102,16,105,253,141,54,12,208,1466
93	1900 DATA18,201,133,208,3,76,132,19,201,134,208,3,76,140,19,201,1772	4D	2160 DATA12,141,191,15,173,192,15,233,0,141,192,15,169,0,141,56,1686	06	2430 DATA6,173,53,12,208,1,96,169,109,133,251,169,25,133,252,24,1814
BC	1910 DATA140,208,3,76,12,20,201,12,208,3,76,157,19,201,14,208,1558	6B	2170 DATA12,141,60,12,173,43,12,141,55,12,169,4,141,59,12,32,1078	82	2440 DATA173,101,16,101,251,133,251,173,102,16,101,252,133,252,160,0,2215
F3	1920 DATA3,76,164,19,201,16,208,3,76,171,19,160,46,217,95,15,1489	8B	2180 DATA146,21,32,194,21,56,173,191,15,233,4,141,191,15,141,195,1769	24	2450 DATA138,145,251,173,103,16,32,210,255,238,101,16,208,3,238,102,2229
B1	1930 DATA240,6,136,16,248,76,60,19,185,251,11,73,128,153,251,11,1864	DA	2190 DATA15,173,192,15,233,0,141,192,15,141,196,15,169,24,141,193,2055	EC	2460 DATA16,96,169,255,32,210,23,169,0,133,212,169,1,141,32,208,1866
B4	1940 DATA76,60,19,169,128,32,148,19,76,60,19,169,0,32,148,19,1174	4C	2200 DATA15,169,46,141,194,15,32,91,21,173,193,15,141,199,15,173,1633	90	2470 DATA169,104,133,251,169,16,133,252,32,155,17,32,38,24,76,214,1815
4D	1950 DATA76,60,19,160,46,153,251,11,136,16,250,96,160,0,162,26,1622	CB	2210 DATA197,15,141,195,15,173,198,15,141,196,15,173,191,15,141,193,2014	F1	2480 DATA21,32,12,20,173,190,15,208,1,96,169,148,133,251,169,16,1654
				07	2490 DATA133,252,32,155,17,169,0,141,24,212,169,255,141,


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02 15,212,169,2096
2500 DATA129,141,18,212,169,
0,141,101,16,141,102,16,173,
46,12,141,1558
77 2510 DATA190,16,173,47,12,14
1,191,16,32,254,23,206,190,1
6,173,190,1870
F1 2520 DATA16,201,255,208,3,20
6,191,16,173,190,16,208,235,
173,191,16,2298
3D 2530 DATA208,230,169,255,32,
210,23,169,0,133,212,169,104
,133,251,169,2467
23 2540 DATA16,133,252,169,128,
141,18,212,169,15,141,24,212
,169,1,141,1941
F6 2550 DATA32,208,32,84,25,32,
155,17,32,38,24,169,194,133,
251,169,1595
A3 2560 DATA16,133,252,32,155,1
7,169,109,133,251,169,25,133
,252,160,0,2006
9D 2570 DATA177,251,201,255,208
,3,76,195,23,172,192,16,208,
8,172,193,2350
9F 2580 DATA16,208,3,76,195,23,
201,50,208,27,169,32,32,210,
255,32,1737
AA 2590 DATA134,18,56,32,240,25
5,192,34,144,8,169,13,32,210
,255,32,1824
36 2600 DATA210,255,76,173,23,1
68,185,95,15,32,210,255,230,
251,208,2,2388
2F 2610 DATA230,252,206,192,16,
173,192,16,201,255,208,3,206
,193,16,76,2435
3D 2620 DATA111,23,169,55,133,2
51,169,17,133,252,32,155,17,
32,134,18,1701
51 2630 DATA96,170,169,109,133,
251,169,25,133,252,24,173,10
1,16,101,251,2173
53 2640 DATA133,251,173,102,16,
101,252,133,252,160,0,138,14
5,251,173,27,2307
EB 2650 DATA212,141,32,208,238,
101,16,208,3,238,102,16,96,1
62,5,32,1810
B4 2660 DATA21,24,168,138,72,15
2,32,210,23,104,170,202,208,
241,169,50,1984
A4 2670 DATA32,210,23,96,173,27
,212,74,74,201,47,176,247,16
8,185,251,2196
DC 2680 DATA11,240,241,152,96,3
2,186,24,169,109,133,251,169
,25,133,252,2223
AA 2690 DATA32,228,255,201,140,
208,9,32,56,25,169,16,141,4,
212,96,1824
2E 2700 DATA160,0,177,251,201,2
55,240,239,201,50,208,3,76,1
42,24,32,2259
3D 2710 DATA100,24,238,192,16,2
08,3,238,193,16,230,251,208,
210,230,252,2609
86 2720 DATA76,49,24,168,185,35
,8,168,132,253,185,82,8,32,1
50,24,1579
2D 2730 DATA230,253,164,253,185
,82,8,240,13,72,169,1,32,165
,24,104,1995
D0 2740 DATA32,150,24,76,113,24
,173,44,12,32,165,24,96,169,
4,32,1170
DF 2750 DATA165,24,76,83,24,170
,169,17,141,4,212,32,166,24,
169,16,1492
A6 2760 DATA141,4,212,96,170,17
3,199,15,141,104,17,169,0,14
1,105,17,1704

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39 2770 DATA173,105,17,240,251,
202,208,237,96,120,169,9,141
,20,3,169,2160
1A 2780 DATA25,141,21,3,169,127
,141,13,220,169,1,141,105,17
,141,26,1460
7C 2790 DATA208,169,0,141,18,20
8,141,110,17,169,27,141,17,2
08,169,15,1758
61 2800 DATA141,24,212,169,0,14
1,5,212,169,240,141,6,212,17
3,102,17,1964
11 2810 DATA141,0,212,173,103,1
7,141,1,212,169,16,141,4,212
,169,0,1711
62 2820 DATA141,192,16,141,193,
16,88,96,173,25,208,141,25,2
08,238,110,2011
E6 2830 DATA17,173,110,17,41,3,
168,141,110,17,185,106,17,14
1,18,208,1472
BC 2840 DATA173,105,17,208,8,20
6,104,17,208,3,238,105,17,19
2,0,240,1841
AA 2850 DATA3,76,129,234,76,49,
234,120,169,49,141,20,3,169,
234,141,1847
DC 2860 DATA21,3,169,129,141,13
,220,169,0,141,26,208,169,15
,141,25,1590
81 2870 DATA208,88,96,162,50,32
,101,25,173,18,208,48,251,32
,101,25,1618
14 2880 DATA202,208,242,96,173,
18,208,201,250,144,249,96,0,
7,51,9,2154
56 2890 DATA173,51,9,72,32,8,0,
201,40,240,35,198,9,32,107,2
3,1230
07 2900 DATA32,2,0,160,192,201,
16,24,19,33,26,27,26,43,40,4
0,881

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Adventure Kit IV



PROGRAM: VOCAB EDITOR

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1C 10 IFFL=1THENFL=FL+1:LOADFIS
,DE,1
55 20 IFFL=2THENS0
D5 30 POKE53280,0:POKE53281,0:P
OKE646,15:POKE56,6*16:CLR
D8 40 VE=29875:NO=VE+1:AD=NO+1:
AJ=AD+1
1C 50 PRINT"[CLR]"TAB(5)"ADVENT
URE KIT VOCABULARY EDITOR"
AF 60 PRINT"[DOWN2]"TAB(11)"1.
EDIT NOUNS"
0A 70 PRINT"[DOWN]"TAB(11)"2. E
DIT VERBS"
8E 80 PRINT"[DOWN]"TAB(11)"3. E
DIT ADVERBS"
E8 90 PRINT"[DOWN]"TAB(11)"4. E
DIT ADJECTIVES"
75 100 PRINT"[DOWN]"TAB(11)"5.
SAVE TABLES"
55 110 PRINT"[DOWN]"TAB(11)"6.
LOAD TABLES"

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SA 120 PRINT"[DOWN]"TAB(11)"7.
TEST TABLES"
B0 130 GET I$:IF I$<"1"OR I$>"7" I
HEN130
18 140 ON VAL(I$)GOTO150,160,17
0,180,230,190,590
7F 150 TA=30976:TL=NO:I$="NOUN"
:LL=1024:GOTO330
02 160 TA=29952:TL=VE:I$="VERB"
:LL=1024:GOTO330
69 170 TA=32000:TL=AD:I$="ADVER
B":LL=256:GOTO330
59 180 TA=32256:TL=AJ:I$="ADJEC
TIVE":LL=256:GOTO330
0F 190 INPUT "[CLR]INPUT FILE N
AME";FI$
C7 200 INPUT"[DOWN]DEVICE (8=DI
SK...1=CASSETTE)";DE
FD 210 PRINT"[DOWN3]LOADING TAB
LES ....."
A9 220 FL=1:GOTO10
93 230 RESTORE:FOR I=870TO924:R
EADX:POKEI,X:I=I+X:NEXT
D5 240 IF I<5940 THEN PRINT"DA
TA ERROR":END
03 250 INPUT "[CLR]INPUT FILE N
AME";FI$
AA 260 INPUT"[DOWN]DEVICE (8=DI
SK...1=CASSETTE)";DE
58 270 PRINT"[DOWN3]SAVING TABL
ES ....."
B2 280 SYS 870 FI$,DE,2,29875,3
2767
2F 290 GOTO 50
E2 300 DATA 32,212,225,32,253,1
74,32,138,173,32,247,183,165
,20,72,165,21,72,32,253
6D 310 DATA 174,32,138,173,32,2
47,183,165,1,41,254,133,1,16
6,20,164,21,104,133,21
24 320 DATA 104,133,20,169,20,3
2,95,225,165,1,9,1,133,1,96
D4 330 PRINT"[CLR]"TAB(12)"EDIT
"TAB(12)"TABLE"
24 340 PRINT"[DOWN]THERE ARE"PE
EK(TL)I$S ENTERED"
E0 350 PRINT"[DOWN3]"TAB(10)"1.
VIEW "TAB(10)"TABLE"
58 360 PRINT"[DOWN]"TAB(10)"2.
ADD "TAB(10)"TABLE"
DF 370 PRINT"[DOWN]"TAB(10)"3.
CLEAR "TAB(10)"TABLE"
22 380 PRINT"[DOWN]"TAB(10)"4.
REMOVE "TAB(10)"TABLE"
C9 390 PRINT"[DOWN]"TAB(10)"5.
MAIN MENU"
C3 400 GETI$:IF I$<"1"OR I$>"5" I
HEN400
59 410 ON VAL(I$) GOTO 420,510,
570,550,50
60 420 IF PEEK(TL)=0THEN330
45 430 PRINT"[CLR]":C=0:FORJ=1T
OPEEK(TL)
97 440 PRINTTAB(17)J;:FORL=1TO
4:PRINTCHR$(PEEK(TA+(J-1)*4+
L-1));:NEXT:PRINT
24 450 C=C+1:IFC<22THEN480
8A 460 GETI$:IF I$=""THEN460
60 470 PRINT"[CLR]":C=0
63 480 NEXT
C7 490 GETI$:IF I$=""THEN490
CC 500 GOTO330
E3 510 INPUT"[CLR]WORD NUMBER";
W:INPUT"WORD";W$
9F 520 IFLEN(W$)<4THENW$=W$+CHR
$(32):GOTO520
04 530 FORI=1TO4:POKETI+(W-1)*4
+I-1,ASC(MID$(W$,I,1)):NEXT:
POKETL,PEEK(TL)+1
29 540 GOTO330
75 550 INPUT"[CLR]WORD NUMBER";
W

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A6 560 FORI=1TO4:POKETAL(W-1)*4
+I-1,32:NEXT:POKETL,PEEK(TL)
-1:GOTO330
DA 570 POKETL,0:FORQ=1TOLL:POKE
(TA-1)+Q,32:NEXT:GOTO330
30 580 SYS7*4096:PRINTPEEK(897)

BE 590 PRINT"[CLR]":SYS7*4096
F0 600 IF PEEK(897)=255THEN PRI
NT"[HOME]ERROR IN TEXT":FORI
=1TO500:NEXT:GOTO590
56 610 PRINT"[HOME]VERB:[SPC5]"
PEEK(880)
56 620 PRINT"[DOWN]ADVERB:[SPC3]"
PEEK(881)
5D 630 PRINT"[DOWN]ADJ 1:[SPC3]"
PEEK(882)
71 640 PRINT"[DOWN]NOUN 1:[SPC3]"
PEEK(883)
6E 650 PRINT"[DOWN]ADJ 2:[SPC3]"
PEEK(884)
02 660 PRINT"[DOWN]NOUN 2:[SPC3]"
PEEK(885)
F2 670 PRINT"[DOWN]WITH:[SPC5]"
PEEK(886)
90 680 PRINT"[DOWN]TO :[SPC5]"
PEEK(887)
C5 690 IS="":IFPEEK(896)>0THEN
FORI=0TOPEEK(896)-1:IS=IS+CH
R$(PEEK(49920+I)):NEXT
69 700 PRINT"[DOWN]TEXT:[SPC5]"
IS
36 710 PRINT"[DOWN]PRESS + TO
EXIT ELSE ANY KEY"
10 720 GETIS:IFIS=""THEN720
FD 730 IFIS="+":THEN50
CD 740 GOTO590

```

PROGRAM: PARSER LOADER

```

B5 10 REM*****
**
BE 20 REM* ADVENTURE KIT PART 4
*
AE 30 REM* PARSER MODULE
*
B7 40 REM*****
**
11 2000 FORL=0TO75:CX=0:FORD=0T
O15:READA:CX=CX+A:POKE28672+
L*16+D,A:NEXTD
82 2010 READA:IFA<>CXTHENPRINT"
ERROR IN LINE";2040+(L*10):S
TOP
0F 2020 NEXTL:END
DF 2040 DATA32,34,112,173,115,3
,141,130,3,173,120,3,13,121,
3,13,1189
74 2050 DATA122,3,13,123,3,13,1
24,3,13,125,3,13,126,3,141,1
29,957
3A 2060 DATA3,96,160,0,169,9,32
,210,255,169,0,141,160,195,1
41,161,1901
3B 2070 DATA195,162,22,160,0,24
,32,240,255,160,0,32,207,255
,201,13,1958
80 2080 DATA240,6,153,80,195,20
0,208,243,140,161,195,169,25
5,141,162,195,2743
FD 2090 DATA173,162,195,208,1,9
6,160,0,140,112,3,140,113,3,
140,114,1760
3E 2100 DATA3,140,116,3,140,115
,3,140,117,3,140,118,3,140,1
19,3,1303

```

```

23 2110 DATA140,120,3,140,121,3
,140,122,3,140,123,3,140,124
,3,140,1465
BC 2120 DATA125,3,140,126,3,140
,160,195,140,128,3,140,127,3
,160,0,1593
07 2130 DATA140,165,195,172,165
,195,140,127,3,32,175,115,32
,149,115,32,1952
8F 2140 DATA190,115,173,163,195
,240,6,238,165,195,76,147,11
2,32,19,116,2182
B5 2150 DATA173,163,195,48,6,16
9,255,141,120,3,96,238,166,1
95,173,166,2307
97 2160 DATA195,141,112,3,173,1
65,195,205,161,195,208,1,96,
238,165,195,2448
2B 2170 DATA173,165,195,141,127
,3,32,175,115,32,149,115,32,
190,115,173,1932
B6 2180 DATA163,195,240,3,76,19
6,112,32,37,116,173,163,195,
240,12,238,2191
44 2190 DATA166,195,173,166,195
,141,115,3,76,84,113,32,55,1
16,173,163,1966
51 2200 DATA195,240,12,238,166,
195,173,166,195,141,114,3,76
,84,113,32,2143
21 2210 DATA73,116,173,163,195,
240,12,238,166,195,173,166,1
95,141,113,3,2362
B1 2220 DATA76,84,113,32,108,11
6,173,163,195,240,8,169,1,14
1,119,3,1741
55 2230 DATA76,84,113,32,91,116
,173,163,195,240,8,169,1,141
,118,3,1723
3F 2240 DATA76,84,113,32,125,11
6,173,163,195,240,3,76,84,11
3,169,255,2017
13 2250 DATA141,121,3,96,173,16
5,195,205,161,195,208,1,96,2
38,165,195,2358
AE 2260 DATA32,175,115,32,149,1
15,32,190,115,173,163,195,24
0,3,76,84,1889
6D 2270 DATA113,32,37,116,173,1
63,195,240,12,238,166,195,17
3,166,195,141,2355
FA 2280 DATA115,3,76,211,113,32
,55,116,173,163,195,240,12,2
38,166,195,2103
7A 2290 DATA173,166,195,141,114
,3,76,211,113,32,91,116,173,
163,195,240,2202
FB 2300 DATA8,169,1,141,118,3,7
6,211,113,32,108,116,173,163
,195,240,1867
5D 2310 DATA8,169,1,141,119,3,7
6,211,113,32,73,116,173,163,
195,240,1833
79 2320 DATA12,238,166,195,173,
166,195,141,113,3,76,211,113
,169,255,141,2367
77 2330 DATA122,3,96,173,165,19
5,205,161,195,208,1,96,238,1
65,195,173,2391
9C 2340 DATA165,195,141,127,3,3
2,175,115,32,149,115,32,190,
115,173,163,1922
E8 2350 DATA195,240,3,76,220,11
3,32,91,116,173,163,195,240,
8,169,1,2035
A3 2360 DATA141,118,3,76,126,11
4,32,55,116,173,163,195,240,
12,238,166,1968
33 2370 DATA195,173,166,195,141
,116,3,76,126,114,32,37,116,
173,163,195,2021
2B 2380 DATA240,23,238,166,195,

```

```

173,166,195,174,115,3,208,6,
141,115,3,2161
92 2390 DATA76,126,114,141,117,
3,76,126,114,32,108,116,173,
163,195,240,1920
39 2400 DATA8,169,1,141,119,3,7
6,126,114,32,91,116,173,163,
195,240,1767
E9 2410 DATA8,169,1,141,118,3,7
6,126,114,32,73,116,173,163,
195,240,1748
40 2420 DATA12,238,166,195,173,
166,195,141,113,3,76,126,114
,32,125,116,1991
B2 2430 DATA173,163,195,240,3,7
6,126,114,169,255,141,123,3,
96,173,165,2215
2F 2440 DATA195,205,161,195,208
,1,96,238,165,195,173,165,19
5,141,127,3,2463
F6 2450 DATA32,175,115,32,149,1
15,32,190,115,173,163,195,24
0,3,76,126,1931
9A 2460 DATA114,32,55,116,173,1
63,195,240,12,238,166,195,17
3,166,195,141,2374
29 2470 DATA116,3,76,250,114,32
,37,116,173,163,195,240,12,2
38,166,195,2126
CB 2480 DATA173,166,195,141,117
,3,76,250,114,32,91,116,173,
163,195,240,2245
31 2490 DATA8,169,1,141,118,3,7
6,250,114,32,108,116,173,163
,195,240,1907
97 2500 DATA8,169,1,141,119,3,7
6,250,114,32,125,116,173,163
,195,240,1925
8A 2510 DATA3,76,250,114,169,25
5,141,124,3,96,173,165,195,2
05,161,195,2325
88 2520 DATA208,1,96,238,165,19
5,32,175,115,32,149,115,32,1
90,115,173,2031
32 2530 DATA163,195,240,3,76,25
0,114,32,37,116,173,163,195,
240,12,238,2247
2C 2540 DATA166,195,173,166,195
,141,117,3,76,69,115,32,55,1
16,173,163,1955
19 2550 DATA195,240,12,238,166,
195,173,166,195,141,116,3,76
,69,115,169,2269
FA 2560 DATA255,141,125,3,96,17
3,165,195,205,161,195,208,1,
96,238,165,2422
93 2570 DATA195,32,175,115,32,1
49,115,32,190,115,173,163,19
5,240,3,76,2000
88 2580 DATA78,115,32,37,116,17
3,163,195,240,10,238,166,195
,173,166,195,2292
0B 2590 DATA141,117,3,96,169,25
5,141,126,3,96,160,0,162,0,1
40,163,1772
F2 2600 DATA195,189,240,195,209
,251,208,12,200,232,204,164,
195,208,242,169,3113
E2 2610 DATA255,141,163,195,96,
162,0,172,165,195,185,80,195
,201,32,240,2477
CB 2620 DATA10,157,240,195,200,
232,204,161,195,208,239,140,
165,195,96,169,2806
93 2630 DATA32,141,240,195,141,
241,195,141,242,195,141,243,
195,96,169,207,2814
90 2640 DATA133,251,169,115,133
,252,169,3,141,164,195,32,12
2,115,96,84,2174
7F 2650 DATA72,69,87,73,84,72,8

```



```

4,79,160,0,140,166,195,140,1
63,195,1779
47 2660 DATA162,0,189,240,195,2
09,251,208,12,232,200,192,4,
208,243,169,2714
D5 2670 DATA255,141,163,195,96,
238,166,195,173,166,195,205,
167,195,240,244,3034
EF 2680 DATA165,251,105,4,133,2
51,165,252,105,0,133,252,160
,0,162,0,2138
BD 2690 DATA76,226,115,169,0,13
3,251,169,117,133,252,173,17
9,116,141,167,2417
00 2700 DATA195,32,216,115,96,1
69,0,133,251,169,121,133,252
,173,180,116,2351
A2 2710 DATA141,167,195,32,216,
115,96,169,0,133,251,169,126
,133,252,173,2368
EB 2720 DATA182,116,141,167,195
,32,216,115,96,169,0,133,251
,169,125,133,2240
E3 2730 DATA252,173,181,116,141
,167,195,32,216,115,96,169,2
10,133,251,169,2616
02 2740 DATA115,133,252,169,4,1
41,164,195,32,122,115,96,169
,214,133,251,2305
SF 2750 DATA169,115,133,252,169
,2,141,164,195,32,122,115,96
,173,240,195,2313
CC 2760 DATA201,34,240,9,169,0,
141,163,195,141,128,3,96,172
,127,3,1822
BD 2770 DATA200,162,0,185,80,19
5,201,34,240,10,157,0,195,20
0,232,204,2295
60 2780 DATA161,195,208,239,142
,128,3,140,165,195,238,165,1
95,169,255,141,2739
A3 2790 DATA163,195,96,0,0,0,0,
254,0,255,0,254,0,254,0,239,
1710

```

Ackroyd's Saga II



PROGRAM: MAP EDITOR

```

13 1 IFFL=0THENG
49 2 IFFL<>0THENG
AC 3 FL=FL+1:LOADFI$,DE,1
A2 6 PRINT"[CLR]YOU MUST FIRST
LOAD THE CODE TO BE[SPC6]ALT
ERED. THIS WAS CALLED";
B8 7 PRINT" OBJECT.2 AND[SPC3]W
AS GIVEN IN PART 2"
C4 8 INPUT"[DOWN]FILE NAME";FI$
:INPUT"[DOWN]DEVICE (8=DISK,
1=CASSETTE)";DE:GOTO3
5A 9 POKE 56,8*16:CLR
7A 10 DIM NA$(15)
22 20 GOSUB9000
2D 30 FORI=1TO15:READNA$(I):NEX
I
B3 1000 PRINT"[CLR]"TAB(12)"CUR
RENT POSITIONS"
30 1010 PRINT"[DOWN]"TAB(9)"X C
OORDINATE[SPC4]Y COORDINATE"

```

```

:PRINT
06 1020 FORI=1TO15
3E 1030 PRINTTAB(14)PEEK(34482+
I),TAB(30)PEEK(34497+I):NEXT
:PRINT"[HOME,DOWN3]"
5F 1040 FORI=1TO15
50 1050 PRINTI;NA$(I):NEXT
27 1060 INPUT"[DOWN2,SPC4]SELEC
T NASTY NO (0 TO EXIT)";NN
D6 1070 IF NN>15THEN1000
EF 1075 IFNN=0THEN2000
30 1080 PRINT"[CLR]"NA$(NN)
B6 1090 INPUT "[DOWN]X COORDINA
TE";XC
D7 1100 IF XC>8ORXC<0THEN1080
64 1110 INPUT "[DOWN]Y COORDINA
TE";YC
C9 1120 IF YC>11ORYC<0THEN1080
05 1130 POKE 34482+NN,XC
3E 1140 POKE 34497+NN,YC
0C 1150 GOTO1000
B1 2000 INPUT"[CLR]FILE NAME FO
R SAVING";FI$
74 2010 INPUT"[DOWN]DEVICE (8=D
ISK, 1=CASSETTE)";DE
76 2020 SYS 870 FI$,DE,2,32768,
36175
75 2030 END
76 9000 RESTORE: FOR I=870 TO 9
24: READ X: POKEI,X: T=T+X:N
EXT
9E 9010 IF T<>5940 THEN PRINT"D
ATA ERROR": END
D4 9015 RETURN
D4 9020 DATA 32,212,225,32,253,
174,32,138,173,32,247,183,16
5,20,72,165,21,72,32,253
F7 9030 DATA 174,32,138,173,32,
247,183,165,1,41,254,133,1,1
66,20,164,21,104,133,21
FA 9040 DATA 104,133,20,169,20,
32,95,225,165,1,9,1,133,1,96
F0 10000 DATA PHOENIX,BLOB,FIRE
, SNAKE,CLOUD,WHIRLWIND,SOLDI
ER,EAGLE,WIZARD
B6 10010 DATA GNOME,ZOMBIE,KEY
1,KEY 2,KEY 3,KEY 4

```

Input Clean Up



PROGRAM: INPUT LOADER

```

10 REM * * M/C INPUT.BAS BASIC
LOADER * *
20 :
30 REM (C) KEVIN BLIGHT AUG
UST 1987
40 :
50 REM TO ACTIVATE USE : SYS 48
64, (MAX LENGTH OF INPUT)
52 REM USE 'M/C INPUT READ' TO
READ INPUT IN A BASIC PROGRAM.
60 :
70 PRINT:PRINT "PLEASE WAIT - RE
ADING DATA..."
80 READ S,E : REM START AND END
ADDR

```

```

90 FOR X = S TO E-1 STEP 8
100 T=0:FOR Y=0 TO 7:READ DS: T=
T+DEC(D$):POKE Y+X,DEC(D$):NEXT
110 READ IS:IF T < > DEC(T$) THE
N PRINT "X*DATA ERROR... ADDR ="
;X:END
120 NEXT:PRINT:PRINT "DATA LOADE
D...":END
130 :
140 DATA 4864, 5072:REM START &
END ADDR
150 :
160 DATA 85,FA,C9,00,D0,01,60,C9
,0442 : REM ADDR 4864
170 DATA 51,90,01,60,A9,0B,20,D2
,02E8 : REM ADDR 4872
180 DATA FF,A9,20,A2,00,9D,CC,13
,03E6 : REM ADDR 4880
190 DATA EB,E0,50,D0,F8,A9,72,20
,051B : REM ADDR 4888
200 DATA D2,FF,A9,9D,20,D2,FF,A2
,05AA : REM ADDR 4896
210 DATA 01,86,F8,20,E4,FF,C9,00
,044E : REM ADDR 4904
220 DATA F0,F9,C9,0D,F0,47,C9,22
,04E1 : REM ADDR 4912
230 DATA F0,F1,C9,2C,F0,ED,C9,11
,058D : REM ADDR 4920
240 DATA F0,38,C9,91,F0,37,C9,9D
,0512 : REM ADDR 4928
250 DATA F0,58,C9,14,F0,57,C9,1D
,0455 : REM ADDR 4936
260 DATA D0,02,A9,20,C9,20,90,D3
,03E7 : REM ADDR 4944
270 DATA C9,SF,B0,CF,20,D2,FF,A6
,053E : REM ADDR 4952
280 DATA FB,9D,C8,13,E4,FA,F0,10
,0554 : REM ADDR 4960
290 DATA EB,86,F8,A9,72,20,D2,FF
,0575 : REM ADDR 4968
300 DATA A9,9D,20,D2,FF,4C,2B,13
,03C1 : REM ADDR 4976
310 DATA A6,FB,E8,86,FB,A6,FB,CA
,0675 : REM ADDR 4984
320 DATA 48,A9,20,20,D2,FF,A9,9D
,0448 : REM ADDR 4992
330 DATA 20,D2,FF,86,FB,68,C9,11
,04B4 : REM ADDR 5000
340 DATA D0,05,A9,01,85,FA,60,C9
,0427 : REM ADDR 5008
350 DATA 91,D0,05,A9,02,85,FA,60
,03F0 : REM ADDR 5016
360 DATA A9,00,85,FA,60,A6,FB,E0
,0509 : REM ADDR 5024
370 DATA 01,F0,80,A9,20,20,D2,FF
,0428 : REM ADDR 5032
380 DATA A9,9D,20,D2,FF,A9,9D,20
,049D : REM ADDR 5040
390 DATA D2,FF,A9,72,20,D2,FF,A9
,0586 : REM ADDR 5048
400 DATA 9D,20,D2,FF,A6,FB,CA,86
,057F : REM ADDR 5056
410 DATA FB,4C,2B,13,54,48,49,53
,02BD : REM ADDR 5064

```

PROGRAM: INPUT SAMPLE

```

10 REM * BASIC PROGRAM TO READ
INPUT FROM MACHINE CODE GET INP
UT-ROUTINE *
20 SYS4864,10
30 A$="":IF PEEK(251)=0 THEN 50:
ELSE FOR XX=0 TO PEEK(251)-1
40 A=PEEK(5068+XX):A$=A$+CHR$(A)
:NEXT
50 PRINT "[ ";A$;"]":A%=XX

```


Reveal Your Character



PROGRAM: REVEAL DEMO

```

13 10 BL=18:LN=50:SA=49152
5B 20 FOR L=0 TO BL:CX=0:FOR D=
0 TO 15:READ A:CX=CX+A:POKE
SA+L*16+D,A:NEXT D
A5 30 READ A:IF A<CX THENPRINT
"ERROR IN LINE";LN+(L*10):ST
OP
86 40 NEXT L
2F 50 DATA 120,169,0,141,21,208
,169,41,133,251,169,4,133,25
2,169,8,1988
87 60 DATA 133,253,169,193,133,
254,169,0,141,253,2,169,8,14
1,255,2,2275
C3 70 DATA 169,0,141,254,2,32,2
43,192,169,0,162,63,157,64,3
,202,1853
32 80 DATA 16,250,169,13,141,24
8,7,173,33,208,141,39,208,16
9,127,141,2083
A3 90 DATA 13,220,173,13,220,16
9,127,141,13,220,173,13,220,
173,20,3,1911
A6 100 DATA 141,251,2,173,21,3,
141,252,2,169,158,141,20,3,1
69,192,1838
9D 110 DATA 141,21,3,173,17,208
,41,127,141,17,208,169,255,1
41,18,208,1888
F2 120 DATA 32,253,192,238,254,
2,169,255,162,8,160,0,153,64
,3,200,2145
10 130 DATA 200,200,202,208,247
,169,32,141,0,208,169,58,141
,1,208,169,2353
06 140 DATA 0,141,16,208,169,1,
141,26,208,141,25,208,88,96,
169,1,1638
81 150 DATA 141,25,208,141,21,2
08,173,253,2,240,26,206,253,
2,208,64,2171
18 160 DATA 169,32,141,0,208,16
9,0,141,16,208,32,243,192,32
,253,192,2028
F4 170 DATA 238,254,2,208,43,23
8,0,208,208,3,238,16,208,206
,255,2,2327
37 180 DATA 208,30,169,8,141,25
5,2,173,254,2,201,38,208,12,
169,255,2125
8C 190 DATA 141,253,2,169,0,141
,254,2,240,6,32,253,192,238,
254,2,2179
67 200 DATA 108,251,2,169,32,16
0,37,145,251,136,16,251,96,1
72,254,2,2082
5B 210 DATA 56,177,253,233,64,1
45,251,96,84,72,73,83,96,115

```

```

,120,96,2014
6A 220 DATA 67,72,65,82,65,67,8
4,69,82,96,77,69,83,83,65,71
,1197
0E 230 DATA 69,96,73,83,96,82,6
9,86,69,65,76,69,68,0,0,0,10
01
75 240 REM *****
*****
75 250 REM *
*
EF 260 REM * DEMONSTRATION OF T
HE USE OF *
66 270 REM * A SPRITE TO REVEAL
TEXT ON *
31 280 REM * THE 64 SCREEN.
*
5C 290 REM * THIS VERSION IS IN
MACHINE *
49 300 REM * CODE BUT IT COULD
BE DONE *
B4 310 REM * JUST AS EASILY IN
BASIC. *
CE 320 REM *
*
7A 330 REM *****
*****
E4 340 PRINT"[CLR,DOWN4,RIGHT7]
PRESS ANY KEY TO START DEMO"
44 350 GETK$:IFK$=""THEN350
CB 360 PRINT"[CLR]":SYS 49152

```

Extended Backgrounds



PROGRAM: EXTENDED LOADER

```

1D 10 REM **** EXTENDED BACKGRO
UNDS ****
D5 100 DATA76,7,192,76,53,192,0
,120,716
43 110 DATA169,76,162,192,141,2
0,3,142,905
84 120 DATA21,3,169,50,141,18,2
08,173,783
71 130 DATA17,208,41,127,141,17
,208,169,928
72 140 DATA129,141,25,208,169,2
41,141,26,1080
91 150 DATA208,169,127,141,13,2
20,169,255,1302
6D 160 DATA141,6,192,88,96,120,
169,49,861
A4 170 DATA162,234,141,20,3,142
,21,3,726
A5 180 DATA169,0,141,26,208,169
,129,141,983
08 190 DATA13,220,88,96,169,129
,141,25,881
81 200 DATA208,238,6,192,174,6,
192,224,1240
17 210 DATA25,176,18,189,64,3,1
41,33,649
5A 220 DATA208,189,122,192,141,
18,208,104,1182
3F 230 DATA168,104,170,104,64,1
62,255,142,1169
A0 240 DATA6,192,169,50,141,18,

```

```

208,76,860
D2 250 DATA49,234,58,66,74,82,9
0,98,751
60 260 DATA106,114,122,130,138,
146,154,162,1072
39 270 DATA170,178,186,194,202,
210,218,226,1584
3E 280 DATA234,242,250,255,255,
255,255,251,1997
D9 290 L=100:FORI=49152TO493035
TEPB
4D 300 Z=0:FORJ=0TO7:READZ:Z=
Z+2:POKEI+J,Z:NEXTJ:READZ
6B 310 IFZ<>ZTHENPRINT"DATA ER
ROR IN LINE":L=END
DB 320 L=L+10:NEXTI:END

```

PROGRAM: EXTENDED DEMO

```

82 100 REM SET INITIAL BACKGROU
ND COLOURS
E4 110 FORI=0TO24:READJ:POKE832
+I,J:NEXT
5F 120 SYS49152:REM ENABLE ROUT
INE
4A 130 POKE53280,0:REM SET BORD
ER COLOUR
24 140 PRINT"[CLR,DOWN,CYAN,SPC
5]THIS IS A DEMONSTRATION SC
REEN
BE 150 PRINT"[DOWN,PURPLE] SHO
WING HOW YOU CAN HAVE A DIFF
ERENT
9C 160 PRINT"[DOWN,GREEN,SPC7]B
ACKGROUND COLOUR FOR EACH
85 170 PRINT"[DOWN,YELLOW,SPC6]
CHARACTER LINE ON THE SCREEN
62 180 PRINT"[DOWN3,C1,SPC3]AS
WELL AS A DIFFERENT FOREGROU
ND
04 190 PRINT"[DOWN,C3,SPC3]COLO
UR FOR EACH CHARACTER SQUAR
E
A4 200 PRINT"[DOWN3,SPC7,BLACK]
W[WHITE]R[BLACK]I[WHITE]T[BL
ACK]C[WHITE]E[BLACK]N[WHITE]
[BLACK]B[WHITE]Y[BLACK] [WH
ITE] [BLACK]P[WHITE]A[BLACK]
U[WHITE]L[BLACK] [WHITE]W[BL
ACK]I[WHITE]L[BLACK]L[WHITE]
I[BLACK]A[WHITE]M[BLACK]S
7C 210 PRINT"[DOWN]
03 220 A$="[BLACK,C+,WHITE,C+,R
ED,C+,CYAN,C+,PURPLE,C+,GREE
N,C+,BLUE,C+,YELLOW,C+,C1,C+
,C2,C+,C3,C+,C4,C+,C5,C+,C6,
C+,C7,C+,C8,C+]"
E9 230 PRINT" A$"[SPC3]"A$
AC 240 PRINT" A$"[SPC3]"A$"[Y
ELLOW]";
E3 250 FORI=1TO5000:NEXT:REM PA
USE
EA 260 C=0:FORI=1TO500:REM CYCL
E COLOURS
FB 270 POKE832+RND(1)*25,C
85 280 C=C+1:IFC=16THENC=0
A1 290 NEXT
E6 300 SYS49155:REM DISABLE ROU
TINE
A4 310 PRINT"[CLR]";:POKE53281,
0:END
10 320 DATA6,6,2,2,13,13,5,5,5,
9,9,9,11,11,11
4A 330 DATA11,8,8,8,12,11,12,11
,8,8

```


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LOOK OUT FOR COMMODORE DISK USER.

B A E A H

OOPS!

A number of gremlins have appeared in the *Your Commodore* works over the last few months. This is the page where we come clean and give you the latest updates where needed.

Disk Users Handbook

A number of people are reporting errors in some of the programs in this supplement. Again there are no problems in the programs as published. However, should you be getting a SYNTAX ERROR after you have entered the POKES given in the instructions you will find details here of how to get around this.

The POKES to memory locations 43 and 44 are moving the start of Basic to a new area of memory. The new start of Basic can be worked out by the simple equation:

(No. Poked in 43)+(256*No. Poked in 44)

The previous memory location to the start of Basic must always contain the number '0'. Should a zero not be present here then you will get a SYNTAX ERROR after entering the NEW instruction. Modifying the POKE instructions to the following will allow you to use the programs correctly:

1541 Fast Loader
POKE43,0:POKE44,16:POKE4095,
0:NEW
Menu Maker
POKE43,0:POKE44,18:POKE4607,
0:NEW

December 1987

The mad knifeman seems to have got hold of the Budget Calc program somewhere in the production of this article. A number of lines need additions/alterations in order to get this program working correctly.

BUDGET CALC

1640 should have 13 cursor rights not 10
3580 the GO on the end should be GOTO 2600
3060 IFM\$(T)="0"THENHMS\$(T)
="[RIGHT]0000":GOTO 3110

BUDGET REVIEW

1640
PRINT "[RIGHT5,CM,SPC6,CM,
SPC6,CM,SPC6,CM]"

Serious Users Guide

A number of people have reported problems with the Plus/4 Transcript program. It appears that a couple of data lines were corrupted in our listing. Please find the correct lines here. If you have typed in the transcript program all that you have to do to enter the corrections is enter the monitor and use the M command to modify the incorrect portion of code (see your manual for details).

1201 20 BA FF A9 00 20 BD FF:
1209 20 C0 FF A2 0F 20 C6 FF
1211 20 CF FF C9 30 D0 11 20:

A number of people have reported having problems with the Multifile program. To our knowledge there are no errors in this as printed. It appears, from copies of this returned to the office, that many people are trying to RUN this program without reference to the program instructions. You MUST set up a number of program lines yourself BEFORE you attempt to run the program otherwise you will get a SYNTAX ERROR.

The first line that is giving people problems is number 500 in MULTIFILE. Of course this line will give you a SYNTAX error, F=*** is an incorrect statement. Referring to the listing and the instructions you will see that F should hold the number of fields. Let's say you wanted 10 fields, line 500 would become:
500 F=10:REM * NUMBER OF
FIELDS

There are many other lines that need setting up in the same way.

Program Submissions

Due to the illness of our software evaluator some people may be experiencing a delay in getting to replies regarding submissions. We are trying to clear the backlog of programs as quickly as we can but this is taking some time. This backlog also effects Bug Finders and Lifesavers.

We apologise for the delay and would ask that you would bear with us while the backlog is cleared.

The publication of lifesavers has also been halted because of this software backlog. We will be bringing you more short programs and tips as soon as we can.

January 1988

A number of people are experiencing problems sorting out exactly which listing goes with which article. This was caused by the omission of the program headings from the listing pages. Here is a full list of each article and their programs.

C64 Tape System -	TIMER (77) SPOOLER (77)
Ackroyd's Saga -	Loader.1 (78) Loader.2 (79) Loader.3 (81) Loader.4 (82) Loader.4 (82) Loader.5 (83) Loader.6 (86) Code Saver(88) Ackroyds Saga (89)
Enlarging the C64 -	Program 1 (89) Program 2 (90)
Array Display Sub-routines -	Array Loader (90) Array Defs(91)
Sprite Library-	Vehicles. Data (92) Vehicles. Display (95)
80 Character Printout -	ROM80.BAS (95)
Questionnaire 1	BOOT (96) Questionnaire 1 (96)
May I Interrupt? -	Listing 1 (99) Listing 2 (100) Listing 3 (100) Listing 4 (101)
Byting Into the 6510 -	Cursor Rt's (101) Typewriter Rt (101)

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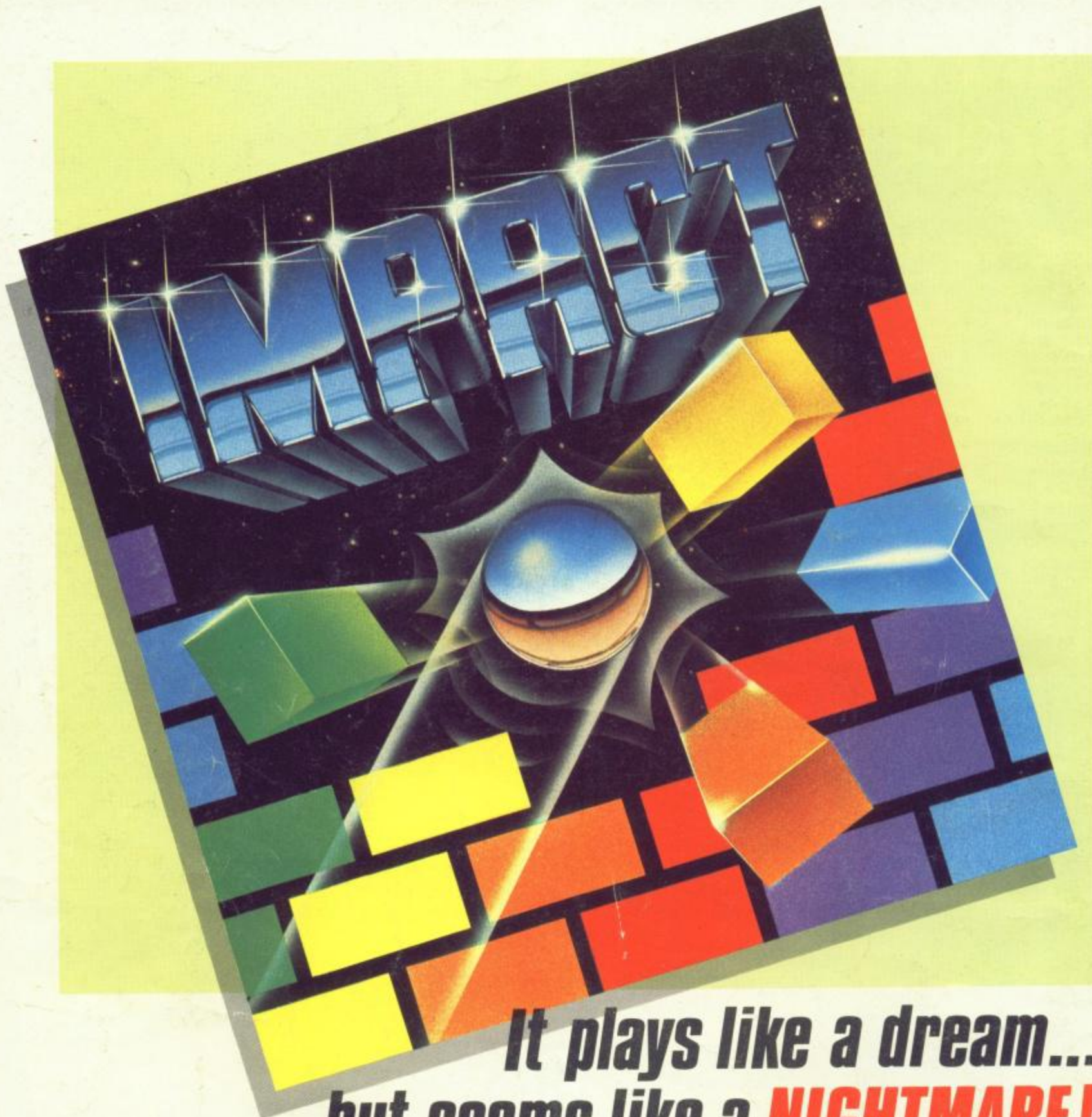
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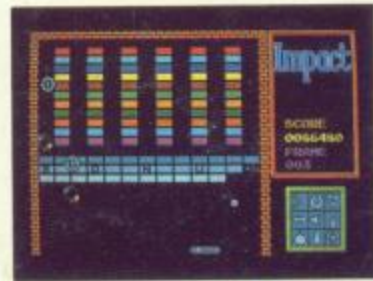
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Your Commodore February 1988

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WEOS—Window



Volume 4 Number 5

Fontmaster

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